THE

AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

Rooms—No. 39 Nassau Street, cor. Liberty Street, opposite the Post-Office, New York.

LONDON:—TRUBNER & CO., No. 60 PATERNOSTER ROW.

VOL. III.—No. 60. NEW-YORK, MONDAY, JUNE 16, 1862. $3 PER ANNUM.

HERRING'S PATENT

Champion Fire-Proof Safes.

Herring's Champion Burglar-Proof Safes, with Herring & Floyd's New Patent Crystalized Iron, the only metal which cannot be drilled.

Nearly 25,000 Herring's Safes have been made and sold, and over 500 have passed triumphantly through accidental Fires, thus fully sustaining their acknowledged and well-earned character as the "best Fire-Proof Safes the world ever saw."

Herring's New Patent Burglar-Proof Safes, made of a combination of Wrought Iron, Patent Crystalized Iron, and Bars of Steel, are confidently offered to the public as the strongest and best security against skilful burglars now extant.

It was a "Herring's Burglar-Proof Safe," the public will remember, which so lately held secure its trust against the determined ingenuity of the boldest and greatest mechanical burglars this country has ever known, and saved for the New York Exchange Bank no less than

HALF A MILLION OF DOLLARS.

Herring's Patent Fire and Burglar-Proof Safes *combined*, (one Safe within another,) making the most perfect protection from fire and thieves now known.

FIVE OF HERRING'S SAFES VICTORIOUS!

WELLSBORO', Penn., December 21, 1861.

Messrs. Herring & Co., New York:

Gentlemen,—At the great fire which occurred here on the 18th December last, my store, with a number of other buildings, was entirely destroyed; no less than seven places of business were burnt out and five of your safes severely tested, in every instance saving their entire contents, to the complete and perfect satisfaction of the owners. Two of your Herring's Patent Champion Safes which were in my building remained there through the entire conflagration, and were not opened until the day after the fire. No water was thrown on the building. Everything in my safe after the fire was nearly as good as new. C. L. Wilcox also preserved all his books, papers, and money in two of your safes, both being in same fire. Wm. Roberts was also the fortunate owner of another of your Patent Champion Safes, which was severely tested, and saved completely his books, papers, and money. The result has given great satisfaction, and we want no safe but Herring's Champion. Please send me one same size I last bought of you immediately. Send by N. Y. & Erie R.R. via Tioga depot. JOHN R. BOWEN.

I had two of Herring's Safes in above fire. They saved my books, papers, and $2 000 *in bank bills.* C. L. WILCOX.

HERRING'S PATENT CHAMPION saved my books, papers, and about $400 in *paper money.* I would use no other. WILLIAM ROBERTS.

GREAT FIRE IN PEARL AND FULTON STS.

NEW YORK, Jan. 27, 1862.

MESSRS. HERRING & CO., No. 251 Broadway:

Gentlemen,—The large HERRING'S PATENT CHAMPION SAFE you made for me a few years ago has been put to a severe test in the great fire corner Fulton and Pearl sts., on the 26th inst., which entirely destroyed my building, together with many others.

The fire commenced about 6 o'clock on Sunday morning, and the safe was taken from the ruins after an exposure of more than thirty hours.

Your Safe contained all my books, insurance policies, and other valuable papers besides, gold and silver, bank bills, coupon bonds, &c., amounting to over Two Hundred Thousand Dollars. Everything in the Safe is in perfect order, except the binding of the books being steamed.

Your Patent Champion Safe gives us great satisfaction, and has guarded safely through the fire every dollar of its contents.

Truly yours, A. S. FOSTER.

GREAT FIRE IN NEW JERSEY.

NEW BRUNSWICK, N. J., January 18th, 1862.

Messrs. HERRING & Co.,

No. 251 Broadway, New York:

Gentlemen,—At the recent extensive fire in our city, on Wednesday morning last, 15th inst., I was the fortunate owner of one of your HERRING'S PATENT CHAMPION SAFES, which contained some books and a number of valuable papers.

The heat in my store was very great, and the safe subject to an intense heat. I felt great interest in the safety of my papers, as a number of castings in my store and within a few feet of the safe were melted. Nothing, indeed, was saved in my building, except the contents of your safe, which I am happy to inform you was completely preserved, after a thorough roasting for some seventeen hours. The result has exceeded my anticipations, and fully confirmed my confidence in the security of your Herring's Patent Safe. Please send me another of larger size, and refer all incredulous to my books and papers, which it gives me great pleasure to show.

WM. H. ARMSTRONG.

Herring & Co., 251 Broadway.
Farrel, Herring & Co., Phila.
Herring & Co., Chicago.

IRON FOUNDRIES.

BERGEN IRON WORKS, Established 1833.

R. A. BRICK, Manufacturer of CAST IRON WATER and GAS-PIPES. RETORTS, PIPES, &c., always on hand. Office, 109 Leonard Street, New York.

S. V. MERRICK, J. VAUGHAN MERRICK, W. H. MERRICK.

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MERRICK & SONS, Engineers, Manufacturers of every description of Gas Machinery

Retorts, Bench Castings, Condensers, Washers, Scrubbers, Wet or Dry Lime Purifiers, Coke Wagons, Fire Tools, Wrought Iron Grate Bars, Gasholders, either TELESCOPIC OR SINGLE, WITH SUSPENSION FRAMES COMPLETE; Wrought Iron Roof Frames, for Iron or Slate; Stop Cocks, Exhausters, Steam Pumps, Boilers and Tanks, Steam or Hand Air Pumps for proving Street Mains, Centre Seals, Governors, Wrought or Cast-Iron Lime Sieves for Purifiers, Purifier Hoisting Machines, &c, &c.

Address— MERRICK & SONS,
5th and Washington Streets, Philadelphia.

OREGON FOUNDRY, Nos. 740, 742, 744 Greenwich Street, New York.

HERRING & FLOYD, proprietors, manufacture Gas Compensators of all sizes, Self-Acting Valves, Exhausters upon an improved plan, costing less than half those of English manufacture, also castings of every description for Gas and Water Works.

Herring & Floyd offer for sale Sabbaton's Patent Screening Shovels for coke and coals, made of malleable iron, of all sizes; Sabbaton's Patent Improved Cast Iron Furnace Frame and Door, arranged to protect the iron work of the door and frame from direct contact with the fire; also, Floyd's Patent Malleable Iron Retort Covers, only quarter of an inch thick, but of convex form, and of great strength, as is attested by certificates from several of the leading Gas-works in America. For engravings of all the above patents see AMERICAN GAS-LIGHT JOURNAL for October, 1859, pages 65 and 71.

Samples of the above castings can be seen at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

S. FULTON & CO., (Successors to Colwell & Co.) Manufacturers of Pig Iron and Cast Iron Gas and Water Pipes, also Heavy and Light Castings of every description, No. 207 North Water street and 206 North Wharves, Philadelphia.

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TRANER & MERCER, 117 NORTH Water Street, & 124 North Wharves, Philadelphia, AGENTS FOR THE MERCER FOUNDRY, AND ELK SHEET IRON WORKS.

CAST IRON STREET MAINS; *Bends, Branches, Chemical Retorts, and all kinds of Castings for* GAS-WORKS, either COAL or ROSIN WORKS. SHEET IRON FOR GASOMETERS *cut and punched to order.* BOILER IRON *of all descriptions.* RUSSIA SHEET IRON, TIN PLATES, BLOCK TIN, COPPER, PIG LEAD, SPELTER, and Metals generally.

FLORENCE IRON WORKS.—The subscriber is prepared to execute orders and make contracts for Cast-Iron Water and Gas-Pipes, from 2 inches to 48 inches in diameter; also, Retorts, Bench-Castings, Branches, Bends, and all Castings for Water or Gas-Works. Pipes and Castings coated with Smith's Patent Coal Tar Varnish to prevent corrosion.

JOSEPH G. JONES,
205½ Walnut Street, Philadelphia.

R. D. WOOD & CO.,

MANUFACTURERS OF

CAST-IRON PIPE, RETORTS, &c.

Office, 400 Chestnut Street, PHILADELPHIA.

TO GAS AND WATER COMPANIES:

The undersigned, Agent for Messrs. Thomas Edington & Sons, Phenix Foundry, Glasgow, Scotland, is prepared to contract for all descriptions of Cast-Iron Pipes of their manufacture.

About 6,000 tons of these Pipes have lately been supplied to the Brooklyn Water-works, N. Y., and the Chief Engineer of the Works, A. P. Kirkwood, Esq., is ready to testify to their excellent quality.

ARCH'LD BAXTER, 28 Beaver St., N. Y.

Sole Agent for the United States and Canada

IRON FOUNDRIES.

MORRIS, TASKER & CO., PASCAL IRON WORKS,

[ESTABLISHED 1821,]

PHILADELPHIA, manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap-Welded Boiler Flues,

GALVANIZED WROUGHT IRON TUBES,

ARTESIAN WELL PIPES,

of Wrought or Cast-Iron, screwed together, flush inside and out; Gas-works Castings, Retorts and Bench Castings for Coal Gas-works,; Cast-Iron Street Mains, Bends, Branches, Drips, &c.

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STEPHEN MORRIS, CHAS. WHEELER,
THOMAS S. TASKER, STEPHEN P. M. TASKER.

CAST IRON WATER, GAS, DRAIN AND HEATER PIPES, &c.,

COLUMBIAN IRON WORKS,

OFFICE, No. 46 NORTH SEVENTH STREET, Below Arch Street, Philadelphia.

THOS. M. ADAMS, Proprietor.

S. S. ASHCRAFT, CINCINNATI, O., Manufacturer of Gas and Water-Pipes, with Branches of every description; Retorts for Gas and Oil Works; Gasholder Stands, Columns, &c.; Gas Purifiers, Condensers, and Gas Apparatus of all kinds; Foundry Work in general.

N. B.—A complete selection of Patterns on hand. Refer to any of the Gas-Works in the Western and Southwestern States.

THEODORE SCOWDEN, Engineer, Louisville.
JOHN JEFFREY, Civil Engineer, Cincinnati.
JACOB HOUGHTON, Engineer, Detroit.

WARREN FOUNDRY AND MACHINE CO., Phillipsburg, N. J. Manufacturers of Cast-Iron Pipes, from 2 to 48 inch diameter, all pipes from 8 inch to 48 inch cast vertically, and in dry sand, in lengths of 12 feet. 2 inch pipes in lengths of 7 feet. Special Castings of all descriptions furnished at short notice.

REFERENCES.

Croton Aqueduct dept., N. Y.
Manhattan Gas Lt. Co., N. Y.
Brooklyn Water dept., N. Y.
Brooklyn Gas Lt. Co., N. Y.
Citizens' Gas Lt. Co., Brooklyn, N. Y.

CAST IRON PIPES.—EARL'S IRON WORKS, NEWARK, N. J., 91, 93, 95, 97 and 99 Chestnut Street. Branch Office, 21 Centre street, New York.

The subscriber continues to manufacture Superior Cast-Iron Gas and Water Pipes, Branches, Bends, Angles, Bevel Hubs, Reduces, Sleeves, Drip Syphons, Plugs, Caps, Retorts, Bench Castings, and Castings in general. Particular attention paid to all Castings connected with Gas-Works. E. B. EARL.

TO VERTICAL PIPE MANUFACTURERS.—WANTED, a situation as Foreman, or would prefer taking the work by contract, by a man that has had twenty years' experience in Vertical Pipe Moulding; also, has had some years' experience in Green Sand Moulding; best of reference given. by addressing FIRTH & INGHAM, Warren Foundry and Machine Shop, Phillipsburg, New Jersey.

GAS-HOLDERS.

GASOMETERS, RETORT-HOUSE ROOFS, WATER-TANKS,

PURIFYING-BOXES, COAL-CARS, COKE BARROWS,

AND ALL KINDS OF

WROUGHT-IRON WORK FOR GAS AND WATER WORKS.

Manufactured by GEORGE W. KRAFT, Chestnut street wharf, West Philadelphia Pa.

POOLE & HUNT, BALTIMORE, MD., are prepared to execute orders for

GAS-HOLDERS,

IRON-ROOF FRAMING,

And all other descriptions of

Iron Work for Gas-Works, Water-Pipes, and Heavy Castings, and Machinery generally.

STOP-COCKS, &C.,

DANIEL THOMPSON, Machinist and Manufacturer of Stop-Cocks, Fire-Plugs, &c., for Water-Works, Stop-Cocks, Valves, Drip Pumps, &c. for Gas-Works, No. 129 Elfreth Alley, Philadelphia.

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THE LUTHER ATWOOD OIL COMPANY'S

DEODERIZED

ILLUMINATING OIL,

Unsurpassed by any KEROSENE manufactured. Is nearly COLORLESS, of a PLEASANT ODOR, and burns without smoke, or crusting the wick. WARRANTED NON-EXPLOSIVE.

For sale in any quantity at a greatly reduced price.

Packed in cans and cases for foreign markets. Apply to U. TALLMAN,
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COAL OIL! COAL OIL!! of the celebrated brand of "SILVER SPRING." A superior burning oil, white, pure, safe, and odorless.

J. S. STANTON, Manufacturer,
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A LAMP CHIMNEY THAT WILL not break.—Made for the million.

The patent Mica Chimneys for coal-oil Lamps possess many advantages over the glass chimneys. They do not break from the heat, falling, cleaning, or any ordinary usage. When one is purchased it will last, with care, as long as the lamp. They fit all the burners now in use.

AMOS HORNING,

Agent for Manufacturer,
No. 321 North Second st.,
Philadelphia.

N. B.—Coal-Oil Lamps and Coal-Oil at low rates.

PATENTED OCT. 8, 1861.

Dithridge's Patent

OVAL LAMP CHIMNIES,

for Coal-Oil burners. Manufactured of

XX FLINT GLASS.

These chimnies are intended for the flat flame which, heating all parts of the glass equally, does not expose it to cracking.

E. D. DITHRIDGE,
Fort PittGlass Works,
Pittsburg, Pa.

THE LOVERS' LAMPS.—Price Five Shillings ($1.25) each. To supersede Candles and Night Lights. No Dressing or Trimming required.

EDMUND SPILLER,
Patentee,
98 HOLBORN-HILL, LONDON.
Post-Office orders attended to.

Ambrose's

PATENT

COAL-OIL,

NO-CHIMNEY

BURNER,

For Portable LAMPS, LANTERNS, Etc. Requires no Chimney.

Address,

J. E. AMBROSE,
249 Pearl st.,
New York, or
45 Newark Av.,
Jersey City, N. J.

COAL OIL, FOR BURNING.—FINE quality, 40 to 50 cents per gallon, according to quantities. Dealers and consumers can obtain it at the above rates of XAVIER GEX, coal-oil refiner, 75 William street.

AGENTS.—TO ALL WHO USE Candles.—The Candle Lamp just out. Safety and economy in light. No excuse for using explosive fluids. No dropping of tallow on carpets. The Candle Lamp will be sent free on receipt of 25 cents. Agents, male and female, can make a larger profit, and find a quicker sale for the Candle Lamp, than any article yet offered to the public. Send red stamp for illustrated circular.

WM. SUMNER, 208 Broadway, (room No. 10,) N. Y. city.

(View of F. Butts & Co.'s Coal Pier, Cleveland, O., on the Government and Cleveland & Pittsburgh R.R. Piers at the mouth of the Cuyahoga River, Lake Erie.)

F. BUTTS & CO.,

(Successors to BUTTS & KENDALL,)

DEALERS IN THE CELEBRATED

STERLING COAL!

PITTSBURGH, AND OTHER GAS COALS,

CLEVELAND, OHIO.

Dear Sir:—We beg leave to call your attention to the following, from which, and others, (and the universal expression of Gas men, as to the superior quality of Sterling Coal,) we believe that it is the best Gas Coal in the country.

From the MANHATTAN GAS LIGHT CO., New York.

Gentlemen:—Yours of the 9th inst. is received. The "Sterling Coal" received from you during the past year worked very satisfactorily—averaging 9,520 cubic feet of 15 candle Gas per ton of 2,240 lbs., and 41 bushels of Coke weighing 1,465 lbs.

We consider it among the best of American Gas Coals, for the quantity and quality of the Gas produced, and also for the excellent quality of its Coke.

I am Gentlemen, Your Obedient Servant, CHARLES ROOME, President.

From the OGDENSBURGH GAS CO., Ogdensburgh, N. Y.

January 6, 1862.

Messrs. F. Butts & Co.—This Company has used your Sterling Coal since July, 1860. We consider it the best Coal we have ever used; gives us larger yields of Gas, requires less lime, and makes a superior Coke. Respectfully, Yours, R. E. GORDON, Sup't Og. Gas Works.

From the RONDOUT AND KINGSTON GAS LIGHT CO., Rondout, N. Y.

January 10, 1860.

Messrs. F. Butts & Co.—Gentlemen:—This Company have used your Coal nearly two years. It is in every respect satisfactory, and to it is given the preference over all other coals. Its average yield is 4 40.100. The light clear and strong. The Gas is easily purified and quite free from sulphur. The yield of Coke is large and of superior quality. It is, in my opinion, equal to any Gas Coal in the market. Very Respectfully, WM. W. HAGUE, Sup't.

From the SANDUSKY GAS CO., Sandusky, O.

January 6, 1862.

Messrs. F. Butts & Co., Cleveland.—Gentlemen:—We have used your Sterling Coal for two years and six months past, and find it superior in quality and all that a number one Gas Coal can be. The illuminating power of the Gas is high, the Coke is of a superior quality, and in many instances our monthly average product has been 4 40.100 per one lb. Coal. It gives us entire satisfaction. I am, Gentlemen, Yours, Respectfully, WILLIAM HUDSON, Sup't and Sec'y.

From the TOLEDO GAS LIGHT CO., Toledo, O.

Gents:—Your favor of the 28th inst. to hand and noted.

The Sterling Coal received from Messrs. Butts & Co., the last summer and fall, fully sustains the character it has as a Gas Coal, from previous use in our works. We think the quality of Gas is very good, a little better than that produced from the Coal had of them the year previous—yielding 8,666 feet per ton of 2,000 lbs., and 30 bushels of Coke of very good quality, well adapted to our use.

Respectfully, Yours, GEO. SPENCER, President.

From the BUFFALO GAS LIGHT CO., Buffalo, N. Y.

Messrs. F. Butts & Co.—The Sterling Coal we have had from you we find to be an excellent Gas Coal. The yield of both Gas and Coke is good. The illuminating power of the Gas is high and the quality of the Coke is very good. ROBERT ROBSON, Foreman Gas Works.

From the CLEVELAND GAS LIGHT & COKE CO., Cleveland, O.

Gentlemen:—This Company has used between 3,600 and 4,000 tons of your "Sterling Coal," and are still using it with very satisfactory results. We find the average product of a ton of 2,000 lbs. is about 8,800 feet of Gas, and about 37 bushels of Coke. The Gas is of good illuminating power and quite free from sulphur or other impurities, one bushel of lime purifying 9,000 feet, and the Coke of very superior quality.

The yield of Gas is about the same as from the Pittsburgh Coal, and the Coke is better adapted to our use. Yours, Truly.

T. DWIGHT ELLS, Secretary.

From the ALBANY GAS LIGHT CO. Albany, N. Y.

Messrs. F. Butts & Co.—Gentlemen:—We have been using your "Sterling Coal" at these works for two years, finding it all that is important in Gas-making Coal, as respect yield and quality of Gas, and freedom from sulphur—as much so as any of the Coaking Coal in use. We are disposed to contract for a further supply of the same quality.

Very Respectfully, PAUL A. SABBATON, Sup't.

From the TROY GAS LIGHT CO., Troy, N. Y.

Messrs. F. Butts & Co.—Gentlemen:—The Coal we have used for the past year at our works has been mostly "Sterling." It has given us full satisfaction in every respect.

S. S. DAUCHY, Sup't.

The following analysis of "Sterling Coal" was made by Prof. J. Lang Cassels, Professor in the Cleveland Medical College, who stands at the head of his profession as a chemist, and any statement made by him can be relied upon with safety.

Sp. gr.	1,288
Eygremaeric Moisture	1.85
Volative Combustible Matters	34.15
Coke (clear and porous)	64.00
	100
Fixed Carbon in the Coke	62.00
Ashes (yellowish white)	2.00
	64.00

COMPOSITION OF ASHES.

Silex	0.80
Alumini	0.45
Sulphate of Iron	0.75
	2.00
Per centage of Sulphur	0.23

J. LANG CASSELS, M. D.,
Prof. of Chemistry, Clev. Med. Col.

P. S.—The specimen from which the above analysis was made was taken by myself from a car load, and may be regarded as a fair average; in fact, this coal is very uniform in its characteristics. It also yielded 4 per cent. more gas than the Pittsburgh Coal. J. L. C.

We would also refer to Gas Companies in the following places:

New York City (Manhattan and New York Co.'s), Brooklyn, Albany, Troy, West Troy, Rochester, Oswego, Ogdensburgh, Lansingburgh, Newburgh, Rome, Palmyra, Geneva, Yonkers, Rondout, Kingston, Albion, Brockport, Seneca Falls, Elmira and Lyons, in State of New York; Cleveland, Toledo, Sandusky, Norwalk, Oberlin, Salem and Fremont, in Ohio; Detroit, Ann Arbor, Grand Rapids, Kalamazoo, Jackson and Adrian, in Michigan; Coburg, in Canada; Chicago, Ill., and two Companies in Milwaukee, Wisconsin.

STERLING COAL MINES, situated in Pennsylvania, are wholly under our control; the coal mined and sold only by us or our agents. (Agents in every instance having authority over our signature.)

Five years experience in Mining, Sale and use of Sterling Coal, gives us full confidence in asserting there is no Coal that combines all the requisites so largely for a Gas or Smithing Coal as this.

This year we are several hundred yards further in the Mine than last season, and feel assured Sterling Coal will more than sustain the high reputation it has heretofore gained.

Our facilities largely increased for Mining and Shipping, we are prepared to supply the great demand for this Coal on a much more extensive scale.

Not being dependent upon high water for transportation, but receiving our Coal by RAIL, we are at all times prepared to fill orders, and ready to contract for delivery of the Celebrated Sterling Coal, on board Vessel or Cars at Cleveland, or at works of Gas Light Co's, in any of the Northern States or Canada.

Cleveland, *January* 15, 1862. Address— **F. BUTTS & CO., Drawer 74, Cleveland, O.**

WHERE GAS-WORKS AND WATER-WORKS ARE WANTED.

We are now publishing regularly the names of the thirty thousand post-towns in the United States, so that builders of gas-works and water-works, and the various manufacturers, may see where are new openings for business. And as each post-master will receive several copies of the AMERICAN GAS-LIGHT JOURNAL, for distribution, the number thus circulated will probably exceed *Three Million Copies. What a chance for advertisers!*

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ARRANGED BY STATES AND COUNTIES,

Showing where Gas-Works and Water-Works are Wanted.

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84 Counties, 1,004 Towns, 4 Gas-Works, 2 Water-Works.

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East Fork, Moore's Rest, Wallace's Cross Roads
Loy's Cross Roads, Oliver's, Wilson's.
Robertsville,

Bedford County.

Bell Buckle, Normandy, Rowesville,
Fairfield, Palmetto, *Shelbyville*, (c. h.,)
Flat Creek, Richmond, Unionville,
McGowansville, Rover, Wartrace Depot.

Benton County

Camden, Morgan's Creek, Point Mason,
Chaseville, Onward, Rockport,
Coxburgh, Will's Point.

Bledsoe County.

Bee Creek, Mount Airy, Pitt's Cross Roads,
Fillmore, Nine Miles, Robertson's Cross R'ds
Foster's Cross Roads, Orme's Store, Spencer Hill,
Grassy Cove, *Pikeville*, (c. h.,) Stephen's Chapel.

Blount County.

Brick Mill, Ellejoy, Montvale Springs,
Cade's Cove, Friendsville, Morgantown,
Chilhowee, Gamble's Store, Rockford,
Clover Hill, Louisville, Tuckaleechee Cove,
Cloyd's Creek, Marysville, Unitia.

Bradley County.

Charleston, Meesville, Potter's Branch,
Cleveland, (c. h.,) Muskrat Springs, Stony Point,
Maple Grove, Wansville.

Campbell County.

Archerville, Fincastle, Grantsboro',
Buffalo Creek, Gibson's Store, Jacksborough,
Coal Creek, Straight Fork.

Cannon County.

Auburn, Bradyville, *Woodbury*, (c. h.)
Mechanicsville,

Carroll County.

Atwood, Hico, Macedonia,
Buena Vista, *Huntington*, (c. h.,) Marlborough,
Christmasville, Lavinia, Sandy Bridge,
Clarksburgh, McLemoresville, South Carroll,
Hecla, Terry.

Carter County.

Butler, Dugger's Ferry, Happy Valley,
Carter's Depot, *Elizabethton*, (c. h.,) Limestone Cove,
Cave Spring, Elm Grove, Peoplesville,
Doe River Cove, Roan Mountain.

Cheatham County.

Chesnut Grove, Sewanee, Shaw's Store,
Henrietta, Sycamore Mills.

Claiborne County.

Big Barren, Oldtown, Sycamore,
Clearfield, Pleasant, *Tazewell*, (c. h.,)
Cumberland Gap, Powell's River, Woodson's Cross
Head of Barren, Rob Camp, Roads,
Howard's Quarter, Speedwell, Yellow Springs.

Cocke County.

Bridgeport, *Newport*, (c. h.,) Wilsonville,
Cato, Parrottsville, Wilton Springs,
Hackletooth, Taylorsburgh, Wolf Creek,

Coffee County.

Beech Grove, Hillsboro, Pocahontas,
Forest Hill, Manchester, Summitville,
Hickory Creek, Oak Hill Seminary, Tullahoma.

Cumberland County.

Crossville, Maple Spring, Sandy Mills,
Grassy Cove, Pleasant Hill, Yellow Creek.
Pomona,

Davidson County.

Capital View, Goodlettsville, Ridge Post,
Donelson, Hamilton's Creek, Stewart's Ferry,
Elm Hill, Madison, Tank,
Franklin College, Marrowbone, White Bend.
Nashville, (c. h.,)

Decatur County.

Brodie's Landing, Douglass Springs, Howesville,
Decaturville, Etna, Perrysville.
Hermitage,

De Kalb County.

Alexandria, Liberty, *Smithville*, (c. h.,)
Laurel Hill, Pine Creek, Temperance Hall.

Dickson County.

Barton's Creek, Danielsville, Turnbull,
Bellsburgh, Independence, White Bluffs,
Charlotte, (c. h.,) Laurel Furnace, Williamsville.

Dyer County.

Booth's Point, Forest Hill, Grove Mount,
Chesnut Bluffs, Friendship, Miller's Chapel,
Dyersburgh, Newbern.

Fayette County.

Championville, Hickory Withe, Pierce,
Egypt, Lagrange, Rossville,
Elba, Macon, *Somerville*, (c. h.,)
Fayette Corner, Moscow, Willis' Station,
Galway, Mount Comfort, Wolf River.
Oakland,

Fentress County.

Boatland, *Jamestown*, (c. h.,) Pine Springs,
Coopersville, Pall Mall, Rocky Branch,
Hale's Mills, Traversville.

Franklin County.

Anderson, Elk River, Pettysville,
Cowan, Estell Springs, *Salem*, (c. h.,)
Decherd, Hawkerville, *Winchester*, (c. h.)
Hurricane,

Gibson County.

Antioch, Holly Leaf, Shiloh,
Bluff Springs, Hope Hill, South Gibson,
Chester, Humboldt, Trenton,
Eaton, Pond Hill, Tuckersville,
Enterprise, Poplar Grove, Waterford,
Gibson's Wells, Quincy, Yorkville.
Shady Grove,

Giles County.

Bethel, Cornersville, Midbridge,
Bodenham, Elkmont Spring, Oak Flat,
Bradshaw, Elkton, Poplar Hill,
Brick Church, Gibsonville, Prospect Hill,
Bunker's Hill, Holyoke, *Pulaski*, (c. h.,)
Campbellsville, Lamartine, Vale Mills.
Lynnville,

Grainger County.

Bean's Station, Haynes, Rocky Springs,
Blain's Cross Roads, Horner's Store, *Rutledge*, (c. h.,)
Cedar Cliff, Marshall's Ferry, Spring House,
Cedar Ford, Noe's Ferry, Tampico,
Clear Spring, Powder Spring Gap, Thorn Hill.
Red Hill,

Greene County.

Camp Creek, Gourley's Bridge, Little Chucky,
Caney Branch, Gustavus, Newmansville,
Cedar Creek, Henderson's Mill, Ones,
Clear Creek, Horse Creek, Rheatown,
Fullen's, Laurel Gap, Romeo,
Graysburg, Limestone Springs, Timber Ridge,
Greenville, (c. h.,) Warrensburgh.

Grundy County.

Altamont, (c. h.,) Bersheba Springs, Tracy City.
Pelham,

Hamilton County.

Birch Wood, *Harrison*, (c. h.,) Long Savannah,
Chattanooga, Leonard Springs, Sail Creek,
Chichamoga, Limestone, Snow Hill,
Double Branch, Loddy, Zion Hill.

Hancock County.

Alanthus Hill, Mulberry Gap, War Creek.
Sneedsville,

Hardeman County.

Amity Hill, Hickory Vally, Newcastle,
Black Oak Grove, Jenkins' Depot, Salisbury,
Bolivar, (c. h.,) Matamora, Toone's Station,
Crainsville, Middleburgh, Van Buren,
Grand Junction, Whiteville.

Hardin County.

Bon Eau, Herbertsville, Saltillo,
Chalk Bluff, Ingleside, *Savannah*, (c. h.,)
Gillis Mills, Lowreyville, Smith's Fork,
Hamburg, Monticello, Swallow Bluff.

Hawkins County.

Bull's Gap, Mill Bend, Saint Clair,
Lee Valley, New Canton, Van Hill,
Lyons' Store, Quarrysville, War Gap,
Marble Hall, Red Bridge, Yellow Store.
Rogersville, (c. h.,)

Haywood County.

Bell's Depot, Carolina, Wellwood,
Brownsville, Dancyville, Wesley,
Cageville, Forked Deer, Woodville.
Lanefield,

Henderson County.

Centre Point, Middle Fork, Red Mound,
Farmville, Mifflin, Scott's Hill,
Jack's Creek, Oak Forest, Shady Hill,
Juno, Pleasant Exchange, Spain's,
Lexington, Poplar Spring, Tabasco.

Henry County.

Albany, Conyersville, Mount Holyoke,
Barren Hill, Cottage Grove, Mount Vista,
Buchanan, Ell Grove, Mouth of Sandy,
Caledonia, Haglesville, New Boston,
Chanceford, Manlyville, North Fork,
Cheap Valley, Mansfield, *Paris*, (c. h.,)
Como, Sandy Hill.

Hickman County.

Bluff Point, Dunnington, Pleasantville,
Bon Aqua, Lick Creek, Totty's Bend,
Centreville, Pinewood, *Vernon*, (c. h.,)
Duck River, Whitfield.

Humphreys County.

Big Bottom, Honey Point, Turkey Point,
Buffalo, Silesia, *Waverly*, (c. h.,)
Fowler's Landing, Sugar Wood, Weaw,
Hall's Creek, White Oak.

Jackson County.

Bennett's Ferry, Fort Blount, Mayfield,
Buck Point, Frank's Branch, Meigsville,
Butler's Landing, *Gainesboro*, (c. h.,) New Columbus,
Celina, Granville, North Springs,
Clementsville, Hamilton Landing, Pekin,
Double Springs, Highland, Rocky Mount,
Equality, Lodi, White Plains,
Flynn's Lick, Whitleyville.

Jefferson County.

Chesnut Bluff, Mill Spring, Russellville,
Chucky Bend, Morristown, Snoddyville,
Cynthiana, Mossy Creek, Springvale,
Dandridge, (c. h.,) Nebraska, Strawberry Plains,
Green Vale, New Market, Talbott Mills,
Kansas, Oak Grove, Trion,
Flat Gap, Panther Springs, Whitesburgh,
Leadville, Wittsville.

Johnson County.

Baker's Gap, Little Doe, *Taylorsville*, (c. h.,)
Cable's Valley, Pandora, Trade,
Cobb's Creek, Shady, Ward's Forge.
Shown's Cross Roads,

(To be continued.)

WATER-WORKS OF AMERICA.

BROOKLYN, N. Y.

REPORT OF THE BOARD OF WATER COMMISSIONERS.

NASSAU WATER DEPARTMENT,
Brooklyn, Jan. 1st, 1862.

To the Hon. the Common Council:

Gentlemen,—In accordance with the requirements of the Act entitled an "Act to provide for the Supply of the city of Brooklyn with Water," passed April 16th, 1859, this Board would respectfully report:

That the Water-Works are, at this date, in a perfect state of efficiency. There has been, we are pleased to say, no accident which has for a moment caused the supply of water to be interrupted; on the contrary, it has been ample and of the best quality.

For a detailed statement of the management, operations, and financial condition of the Department, we beg leave to refer you to the various schedules hereunto annexed.

Jamaica Reservoir is now in good condition, except that the embankments are somewhat cut by the action of the water; which will continue to be the case until time shall have formed a natural shore, as a portion of the pond is open to a sweep of the southeast wind for some three-quarters of a mile.

The masonry of the waste-wier at this pond was undermined during a violent storm in July last, and so much injured as to require the work to be taken up and rebuilt.

Notice of this injury to the works was communicated by this Board to the Common Council, and an appropriation of five thousand dollars asked to rebuild the waste-weir. The appropriation was granted, and the work has been done at an expense of five thousand six hundred and sixty-eight dollars and forty-eight cents.

It is proper here to state the cause of the failure of this work. The masonry was originally built upon a timber foundation, which was secured, or intended to be, from undermining, by a row of sheet piling six inches in thickness and driven to the depth of ten feet. If this sheet piling had been faithfully driven, as designed and directed by the engineer in charge of the construction of the works, it would, no doubt, have answered the purpose for which it was intended and rendered the work secure.

In taking up the foundation, it was necessary to take up the sheet piling, and the length of that in the upper row, and upon which the security of the work chiefly depended, was found to vary from *four feet three inches to six feet*, the average length being about five feet. The whole work has been thoroughly rebuilt under the constant supervision of a reliable and competent assistant engineer, and on a somewhat different plan.

The whole foundation of the waste-wier has been enclosed by two rows of sheet piling, each eight inches in thickness; the two upper rows being driven to the depth of *seventeen feet*, and that on the lower side to the depth of ten feet. The sand was then excavated to the depth of four feet, which was replaced with concrete, upon which the masonry has been rebuilt in a thorough and substantial manner.

The sluice-way and gate-house were not taken down, but have been rendered entirely secure by two rows of sheet piling—the upper side driven to the depth of seventeen feet. The work was completed on December 4th, 1861. The water has been shut into the pond, and the work proves to be entirely perfect and satisfactory; being alike creditable to the contractor, Mr. W. C. Kingsley, who rebuilt the work, and to the chief engineer, John S. Stoddard, Esq., who designed and directed it.

RIDGEWOOD RESERVOIR.

This portion of the Water-Works, which has given rise to much speculation heretofore, as to its permanency, is now in use for the fourth winter. There never has been any leak, nor any settlement of the embankments. The stone slope walls are as perfect as when first completed.

During the past year, the Constructing Board have placed a very neat and substantial iron railing around the two divisions of the reservoir, and also completed the gate-way leading to the grounds.

Everything about this division of the work is now in good condition. The general character of the work

is such as will require but little, if any, outlay for repairs, in many years.

The area of water surface is as follows:

Eastern division.....	11¼ acres.
Western division.....	13¼ "
Total water area.....	25½ "

The height of the surface of the water, when the reservoir is full, or the water twenty feet in depth, is one hundred and seventy feet above Navy Yard high water-mark. The average depth of water for the past year, has been fifteen feet three inches; average number of gallons in the reservoir, one hundred and sixteen millions two hundred and sixty-three thousand two hundred and fifty-seven.

The total capacity of this reservoir, when full, is one hundred and sixty-one million gallons.

PRINCIPAL DISTRIBUTING MAIN.

The principal distributing main during the past year has required no repairs; nevertheless, the Board would again particularly and earnestly call your attention to the fact that the city is wholly depending upon a single main for its daily supply of water. The main, so far as can be known, shows no indication that it has, from any cause, become less secure than it was when first laid; or that it might not be relied upon for an indefinite period. But that which now seems so perfect and secure, may, from some unforeseen cause, suddenly, instantly, and wholly, deprive the city of the use of the Nassau water. Its safety, therefore, becomes an absolute necessity. To our citizens, such an accident would prove disasterous in its effects, not only subjecting them to inconvenience and a general derangement in their households, but would inevitably cause great pecuniary losses. It should also be borne in mind that the fire department of the city, almost entirely depend upon this source for a supply of water. Many of the public cisterns, which were formerly dependent upon for a supply, are now entirely destroyed or out of repair. Should a conflagration occur under *such* circumstances, property to the value of millions of dollars might be destroyed. It is confidently hoped by this Board that no such catastrophe may occur; but in our last annual report, the Board called the attention of your honorable body to the fact of a break in two of the mains which supply the city of New York, thereby depriving a large portion of that city of its requisite supply of water. We are again admonished, while recording the fact, that but a few weeks since, a similar accident occurred, and again, one of their thirty-six inch mains was broken. Had their supply depended, as ours does, upon a single main, their misfortune could be better imagined than described.

The laying of an additional main is not only required as a safeguard, but the time is not far distant when an additional main will be imperatively demanded, for the purpose of conducting a sufficient amount of water for daily consumption. Should the daily consumption continue to increase in the same ratio it has heretofore done since the completion of the work, steps could not be taken too soon, to proceed with the laying of an additional main, in order to meet the wants of the citizens who are located on the high grades; for, as the ability of the main to convey water is approached, so will the pressure be diminished by the draught from it before reaching high elevations.

The Board bear in mind the fact that your honorable body have already ordered an additional main to be laid, but neglected to make provision for it, by an appropriation. Your honorable body will permit us again to urge upon your attention, the necessity of ordering the construction of an additional main, so as to preclude the possibility of a serious interruption of the supply.

CONSUMPTION OF WATER.

The amount of water used during the year was one thousand five hundred and forty-nine million four hundred and three thousand four hundred and fourteen gallons, of which has been used for manufacturing and other than domestic purposes, two hundred and eighty million seven hundred and three thousand eight hundred and ninety-four gallons.

The fact is thus made apparent, that, like all other Water-Works, we are suffering from the constantly increasing waste of this valuable necessary of life. We find, after using the greatest possible diligence in endeavoring to protect the works from waste by passing stringent rules and regulations for the government of the water consumers, and appointing inspectors, whose duty it is to constantly guard the distribution of water, and enforce the rules and regulations, that, notwithstanding all our efforts, we are constrained to admit that there is a large amount of water running to waste daily, by carelessness or otherwise. *This Board therefore have come to the conclusion that there is no way to overcome this difficulty, and to effectually check the unnecessary waste, except it be by a general use of the water-meter, which will at once render the distribution of water, just and equitable.* Hoping to meet the hearty co-operation of your honorable body, we shall, at an early day, make a special communication to you, giving the reasons and facts which have led this Board to come to this conclusion, together with such recommendations in reference to water-rates, as the circumstances would seem to require.

All of which is respectfully submitted,

GAMALIEL KING, Pres't,
DANIEL L. NORTHUP, Sec'y,
WILLIAM B. LEWIS,
JOHN H. FUNK,
} *Comr's.*

ENGINEER'S REPORT.

Chief Engineer's Office,
Nassau Water Department,
Brooklyn, Jan. 1st, 1862.

I have the honor to present herewith a statement of the condition of the Water and Sewerage Works on the first day of January, 1862.

JAMAICA RESERVOIR, OR BAISLEY'S POND.

The fences about the pond are in very good condition, and have required but very slight repairs during the past year.

The shore embankment has been in many places considerably cut away, and will require repairs, as soon as the season will permit.

On the first of June, it was discovered that the masonry of the waste-wier was giving out, and the destruction became so complete, from its imperfect construction, that it became necessary to rebuild it, which has been done upon an improved plan.

The work was done under the superintendence of C. E. Botsford, assistant engineer. In the construction, there were driven two rows of sheet piling across the whole front of the masonry, extending into the dam. The piles in these two rows were each seventeen feet in length, and eight inches thick. The average number of blows given each pile, was ninety-eight, by a hammer weighing seventeen hundred pounds, and with a fall of twenty feet.

The whole of the masonry is enclosed by piles, all being, with the exception of the above, ten feet in length. The portion of the branch conduit, next the gate-house, was somewhat injured at the time the masonry gave way; that has been repaired. All the work in connection with the waste-wier is in good condition, and I confidently believe this portion of the work is now secure from danger.

The conduit line from Baisley's pond to the engine house is in excellent condition, and the only repairs required have been to the slope banks, which have been washed down at some places during heavy rains.

At Spring creek, the gate-house masonry and machinery are in good condition.

The Engine-house and Force Mains are in good order, and I would respectfully submit the annexed statement of Robert W. Hamilton, the mechanical engineer.

ANNUAL REPORT OF ENGINEER AT PUMP-WELL.

The buildings at the engine-house are in good order. The roof has leaked, but has been repaired and painted.

The coal-house originally built has been taken down and a new one constructed of an increased stowage capacity of three hundred and eighty per cent. In connection with the coal-house has been constructed a railroad track, connecting with the Jamaica railroad, by which means the coal is discharged from the cars into the coal-room, thereby saving about twenty cents per ton in cartage and handling.

A new pumping engine is in progress of erection. Steam was first applied May 21st, since which date the engine has been in operation from time to time, amounting in the gross to one hundred and seventy-three and one-half hours.

The pumping engine for the past year has performed in the most satisfactory manner; having been in working order during the year, with the exception of seven days, which stoppage was owing to an imperfection in the casting of the lower chamber to the upper pump, which caused it to split. No material damage was caused, as the defect was immediately discovered. The chamber has been thoroughly repaired and strengthened, at an expense of one hundred and twenty-five dollars.

Aside from the above, very slight repairs have been required, the principal part of which have been made by the employees.

The force mains are in good condition—have had but few leaks at the joints, all of which have been repaired without stopping the engine.

Schedule B, in the Appendix, will give a statement in detail of the work done during the past year.

Schedule C, will give a like statement of the consumption of coal, wood, oil, tallow, &c.

Respectfully submitted,
R. W. HAMILTON, Engineer.

SEWERS AND DRAINAGE.

The sewer contracts are nearly complete.

The total length of the sewers constructed is eighty-six and a quarter miles, and experience warrants the statement that the system adopted by the Commissioners is not only economical but successful. The work has been prosecuted rapidly, but under such a constant supervision and inspection, that the fullest confidence is entertained that it is of the most permanent character.

The sewer across the meadow in Union avenue, which was the most critical part of all our work, is believed to be, as a structure, unsurpassed.

The Inspectors have been constantly in attendance on every part of the work as it progressed, and the whole has been subsequently subjected to a rigid final inspection.

Cast-iron curbs for the manholes have been used in many places, and their superiority has been so well established, that no doubt remains as to the propriety of their adoption in the future.

Cast-iron covers of several patterns for the street basins have been used in a number of places, and although my experience has not been sufficient to warrant the expression of a decided opinion, still I entertain a very strong belief that they will eventually prove to be superior to any other heretofore introduced. A new style of street basin, with hemispherical bottom, was suggested by Commissioner King, and has been sufficiently tested to warrant its adoption.

In other respects the work has been carried out according to the original plans.

The statement of all the work contracted for and the average prices of the same differ from the previous statement, because several of the contracts have been curtailed.

Respectfully submitted,
JOHN S. STODDARD, Chief Engineer.

WATER PURVEYOR'S REPORT.

Water Purveyor's Office,
Brooklyn, Jan., 8, 1862.

To the Hon. the Board of Water Commissioners:

Gentlemen,—I have the honor herewith to submit a report of the condition of the Water-Works, so far as the same are under my supervision, together with such statistics as relate thereto.

DISTRIBUTION.

No accident has occurred to the distribution during the past year. The service pipes, hydrants, and other appurtenances of the Water-Works, are placed under the special supervision of the inspectors, who are held responsible for their condition in their several districts, together with inspecting all taps, water connections and pipe, to within the walls of houses. They have now become familiar with the above duties, and the conducting of ordinary repairs.

In consequence of the change of grade on Flatbush avenue, it became necessary to take up the water mains, and relay the same, after the streets had been filled to the grade, on the following street:

Pacific street, twenty-one hundred and thirty feet; Dean street, twenty-one hundred and forty feet; Pearsall street, fourteen hundred and twenty-five feet;

making in all, five thousand six hundred and ninety-five feet (one and seven one-hundreds miles), which was completed on the first of October, at an expense of seven hundred and thirty-nine dollars and thirty-three cents.

DRINKING HYDRANTS.

There have been set, during the past year, two hundred and three drinking hydrants, as follows: First ward, two; Second ward, six; Fourth ward, four; Fifth ward, fourteen; Sixth ward, nine; Seventh ward, fourteen; Eighth ward, twenty-one; Ninth ward, twelve; Tenth ward, eighteen; Eleventh ward, seventeen; Twelfth ward, ten; Thirteenth ward, twenty-three; Fourteenth ward, twenty-five; Fifteenth ward, ten; Sixteenth ward, ten; Nineteenth ward, eight; which have given great relief in many sections of the city where the pump water was of bad quality. It is, however, a difficult matter to keep them in perfect order, as they are roughly used and strained. So far as they are out of order during the summer season, is of little importance, as they are then easily repaired, and the cost is rather in the time expended in visiting them, than any other outlay; but in winter, the least leakage is frozen, and gives more trouble. A general strengthening of the rods and cup cylinders, would remedy the principal difficulty.

Permit me again to call the attention of your honorable board to the important fact, that the city is still depending upon a single thirty-six inch main for its supply of water, some portion of the distance through which the main passes, to wit: at Deep Cut, and at the springs, is of such a character, as to lead me to feel anxious for its safety, as, should a break occur at these localities, it could not possibly be repaired in short of some four or six days. This is now the only weak spot in the works, or where they are not duplicated.

A new forty-eight inch main laid and connected. would relieve the city from any apparent danger.

ANNUAL CONSUMPTION OF WATER.

The consumption of water during the year ending January 1st, 1862, has amounted to. 1,549,403,410 galls.
Of which was used for manufacturing
and other than domestic purposes. 280,703,894 "
For domestic purposes.....1,268,799,520 "

STREET PAVEMENTS.

The bad condition of the street pavements may, in a great measure, be attributed to the fact that plumbers are permitted to open the streets to make connections with sewers and water mains, during the winter months; the earth being frozen, it is impossible to replace it in such a manner as to prevent its settling, thereby making it necessary to notify parties, and repave two or three times during the following summer. In taking up the pavement, it is frequently broken and destroyed, and after filling up the hole, it is impossible to repave, and consequently, heaps of loose cobble-stones are left on the street, to the annoyance of citizens, and endangering horses and vehicles traveling upon the street. The settling over sewer connections, frequently carry away the tap in the water-pipes, causing the streets to be overflowed with water, followed by a very considerable expense, to replace the tap. I would therefore recommend that no openings hereafter be permitted to be made in the public street, while there is frost in the ground.

It is found upon examination, that the wooden hydrant boxes and stop-cock boxes, are very generally much weakened by decay. It will become necessary to replace the greater part of them during the coming year. A great saving of labor, and a great eventual saving in cost, will be made by substituting iron for wood; hence, at the proper time, I shall ask for an appropriation for the coming year for that purpose.

SCHEDULE B.

The following Table will represent the amount of work done with the Engines at Ridgewood Pump-Well for the past year.

	No. of Hours Pumping per Month, Engine No. 1.	Hours Pumping, Engine No. 2.	Strokes made per Month.	Average number strokes per minute.	Number of Gallons pumped per Month.	Average number of Gallons pumped per day for each Month.	Loss by leakage through check valves in gallons, per Month.	Water Pressure at lower Pump per square inch.	Ave. Steam Pressure of Boiler per square inch.	Ave. Vacuum per square inch.
January	271	..	127,314	7 80-100	133,679,700	4,312,248	1,387,050	75 lbs.	15 lbs.	13¼ lbs.
February	209	..	101,800	8 11-100	106,890,000	3,817,500	707,700	" "	" "	" "
March	146½	..	71,622	8 14-100	75,203,100	2,425,938	842,100	" "	" "	" "
April	286	..	140,868	8 20-100	147,911,400	4,930,380	903,800	" "	" "	" "
May	205	3	102,598	8 22-100	107,727,900	3,475,093	1,025,850	" "	" "	" "
June	198½	76	136 719	8 30-100	143,554,950	4,785,165	1,178,900	" "	" "	" "
July	269½	16½	146,492	8 53-100	153,814,500	4,961,758	1,316,700	" "	" "	" "
August	297	..	153,727	8 63-100	161,413 350	5,206,882	1,245 300	" "	" "	" "
September	245	29	141,678	8 63-100	148.761,900	4.958,730	1,105,650	" "	" "	" "
October	221	42	139,887	8 53-100	146,828,850	4,736,414	1.062,600	" "	" "	" "
November	264	7	135,282	8 31-100	142 046,100	4,734,870	1,157,100	" "	" "	" "
December	286	..	147,119	8 62-100	154,474,950	4,933,062	1,206,450	" "	" "	" "
	2,908½	173½	1,545,056	8 35-100	1,622,306,700	4,444,949	13,134,200	75 lbs.	15 lbs.	13¼ lbs.

RECAPITULATION.

Total number of hours pumping for the past year	3,082	Total number of gallons pumped for the year	1,622,306,700
" " strokes made " "	1,545 056	Ave. number of gallons per day for the past year	4,444,949
Ave. " " " per minute	8 35-100	Loss by leakage through check valves " "	13,134,200 gls

SCHEDULE C.

Coal, Wood, Oil, Tallow and Cotton Waste consumed at Engine-House for the past year.

	Lbs. Coal consumed when pumping.	Lbs. Coal to Bank Fires.	Lbs. Wood to Start Fires.	Lbs. Ashes and Clinkers taken from Furnaces	Gallons Oil used per Month.	Lbs. Tallow used per Month.	Lbs. cotton waste used per month.	No. of Leaks in Force Mains.
January	365,000	47,600	1,400	36,500	30	195	19	7
February	271,125	35,100	1,633	27,926	22	137	22	7
March	197,575	25,200	2.800	19,940	20	114	20	1
April	385,475	47,850	1,800	47,190	31	215	19	4
May	302,600	36,000	2,800	38,335	30	144	31	1
June	358,550	49,500	....	57.790	38	268	20	.
July	425,700	48.300	1,634	57,760	36	195	15	.
August	436,200	53,100	....	75,205	35	202	18	.
September	491,100	47,700	....	62,885	34	189	16	.
October	408,840	41,400	1,400	59,575	39	194	14	8
November	393,800	45,000	2.800	64,000	32	232	21	.
December	420,700	50,400	2,000	67,416	33	195	22	.
Total cost	4.884 465	527,150	18,267	*614,572	380	2,280	237	23
	$9,785 00	$1,080 00	$37 00		$393 50	$250 80	$24 87	† $25 50

* Ashes and clinkers 12 per cent. of the coal consumed. † Cost of repairing.

RAIN-FALL OF DETROIT, MICH.—The average annual rain-fall of Detroit, for the twenty-two years past, is 3 feet 7.90 inches. The greatest quantity which fell in any one month during the twenty-two years, was a fraction more than one foot and three inches, in July, 1855, and the least quantity in any month, was a fraction more than the sixth of an inch, in February, 1841.

The observations were made by the Rev. George Duffield, from the year 1840, to 1857, inclusive, and since that time, by Mr. J. Berry.

PETROLEUM AND WATER GAS.—A process has been introduced in Berlin, Prussia, by Schaeffer and Walcker, for making illuminating gas from coal oils, by the simultaneous action of steam and oils, on coal or coke, or metallic iron, or some porous material like pieces of old clay retorts, heated to redness.

We are not advised as to whether any progress has been made with this gas on the continent of Europe.

THE LATE GAS EXPLOSION IN LONDON.

INQUEST ON THE BODIES.

On page 347 of this volume we printed a short account of a fatal gas explosion in London. We now take from the *Journal of Gas-Lighting* the following statement of the evidence before the coroner, in which the whole occurrence is minutely portrayed. The case is an interesting one, and should serve as a monition to officers of gas companies, to require their employees to use all possible care in laying and joining mains.

On Tuesday, the 22d of April, an inquest was held in the Student's Room, King's College Hospital, by Mr. Langham, deputy coroner for Westminster, on the bodies of Edward Rawley, aged 30, and John Morrissey, aged 26, two workmen in the employ of the London Gas Company, who were killed by an explosion of gas, in Holborn, on the afternoon of Wednesday, the 16th ult. The case excited a great deal of interest, and the inquest-room was filled with engineers and others, whose attention was excited by the remarkable circumstances under which the melancholy accident occurred.

Mr. Tindal Atkinson, instructed by Messrs. Crowder and Maynard, appeared to watch the case for the company, and Mr. Isaacson, surveyor for the Holborn District Board of Works, was also in attendance.

The jury, having been sworn, proceeded to view the bodies. On their return, the following evidence was given.

George Bashford: I live at No. 11 Cardigan street, Kennington lane, and am foreman to the London Gas Company. I knew both of the deceased men. Morrissey was a laborer, and Rawley a service-layer in the employ of the company. As foreman of the works, I was superintending the laying down of some new mains in Holborn, last Wednesday. We were engaged opposite Great Turnstile laying the pipes under the foot pavement, at the corner of Featherstone buildings. I did not notice any escape of gas. I have been engaged in such works for fourteen or fifteen years, and know that it is possible to lay mains without gas being allowed to escape. This accident occurred about twenty minutes to five in the afternoon. At the time Rawley was in the act of connecting the service-pipe of Mr. Warr, the stationer, with the main. He was standing on the main in the footpath, and Morrissey was wetting the clay at the end of the plug, which was in the head of the last length of main-pipe put in. I was about 14 feet from the deceased, when I heard a loud report. Rawley had bored a hole in the main-pipe, and was in the act of putting in the service, when the explosion took place. I am positive that no light was being used by either of the men, as it was in the daytime, and no fire nor soldering operation was required, as the pipe was an iron one, with a thread cut on it, which screwed in a socket. I cannot account for the explosion in any way. When I heard the explosion, I ran to the end of the main, put the plug in again, and covered it with clay. I did not hear any second report. Morrissey had his legs broken by the explosion. He was thrown a little distance, but he crawled out of the trench on his knees. Rawley was thrown on the flat of his back, on the foot pavement, where he had been at work. They were both taken up, and brought to the hospital. I am satisfied the pipes were all sound, and not at all disturbed or broken by anything that was going on beforehand. I did not smell any escape previously, to warn me that any mischief was likely to occur.

Joshua Greenwood: I reside in Paradise street, Lambeth, and am a laborer employed by the company. I was at work in Holborn, on Wednesday last, at the time of the accident, and was about five yards from the deceased; I was transferring services to the new main that had been laid down, and Rawley was engaged with me three minutes beforehand. Morrissey was stopping up the main, and making it secure for the night. I had no knowledge that the main was at all damaged; it was perfectly sound as far as I know. I had not observed the least escape of gas from the time the bladder was put in in the morning. If the bladder is quite sound and blown out, it will keep the gas from escaping a long time. In using the bladder, a hole is drilled in the main, and the bladder being inserted, is blown out, and it then keeps the main quite tight. I have been employed by this gas company for about

twelve years. The accident occurred at twenty minutes to five o'clock, but how the explosion arose is a mystery. Ten minutes before I had tapped a hole in the main to connect a service about three yards from where the bladder was, and I did not observe the least escape of gas.

The Coroner: Perhaps, from being so constantly used to it, you would not observe the escape of gas so readily as a stranger would?

Witness: Oh, yes; I should notice it in a minute, if there had been any escape. I assisted Morgan, one of the injured men, after the accident. He is not dead, but I believe is not so well to-day as he has been. Neither of us had a light at the time of the explosion. None of us were smoking. I do not know whether any one who was passing at the time was smoking.

Michael Neal: I reside at No. 11 Vauxhall walk, and am a laborer in the employ of the company. I was at work near the deceased at the time of the accident, taking up a dead main. When I heard the explosion, I laid down my pick and shovel, and ran towards the place. On my way, I met a plumber, who appeared very much confused. I said to him, "You have done this." At first, he did not make any reply; and, when I said so a second time, he answered, "Yes; I have done it—I know I have done it." I went up to the gauger, George Bashford, and some one asked if any one could tell how it occurred. I said directly, "The plumber has done it; he told me so." I cannot say whether the plumber was in the service of the gas company. He was engaged repairing a water-pipe which we had broken in opening the ground to lay down the main. We often break the pipes in that way; it cannot be helped. There was only one broken at this place. The plumber had a red-hot iron in his hand, and I have no doubt it was that which caused the explosion. He was using it about forty or fifty yards from where the accident took place. I noticed a smell of gas after the explosion, but not before. I have been at the same kind of work about two years, and have seen plumbing work going on at the same time that service-pipes are being laid into mains. I do not know whether it is a usual thing, but I have seen it done. I do not see that it is attended with much danger. When I told Bashford that the plumber had done it, he went to him, and had some conversation about it.

By the Jury: At the time of the explosion, I saw smoke coming from the trench. The plumber had a fire on the other side of the road. He was about fifty yards from where the main exploded. The smoke I saw after the explosion was from the dead end of the main which was being laid. The gas was shut off behind, but I suppose there was some imperfection in the bladder, which allowed it to escape.

George Smith: I am a plumber, and live in White Hart street, Drury Lane. I was employed by the gas company at the work in Holborn, at the time the explosion took place, repairing a lead water-pipe which had been broken. I had noticed a slight escape of gas from a pipe which was detached about nine feet from where the man fell. I drew the attention of the ganger of the works to it, and he sent a man to secure it. I worked in the same hole for about ten minutes or a quarter of an hour afterwards, and noticed no smell whatever. I then left the hole, and asked the foreman to give me a man to procure another lead pipe, and, while he did so, the explosion took place. I had not been using a hot iron at all that afternoon. There was another plumber at work, I believe. He was about fifty or sixty yards, I dare say, from where the explosion took place. I had not been at work upon that part of the pipe that burst.

Edward Lee: I am a plumber, and reside at 26 St. George's road, Pimlico. At the time of the accident, I was employed on the spot by Mr. Smith, who had a contract with the London Gas Company to repair the water-pipes that were broken in laying the main in Holborn. I had not noticed any escape of gas prior to the explosion, nor at any time during the afternoon. I was directly behind the place where the first report occurred. I was using a red-hot iron at the time, making a soldered joint. There was first a flash, similar to what it would be from a gun, and almost the same instant there was a report.

The Coroner: Then, there must have been an escape of gas to cause this explosion, although you did not notice any smell?

Witness: There was no escape previously that I am aware of. It must have come almost directly at the time I was using the iron. I do not know but what it might have escaped just while I was taking the metal out of the fire, but I smelt nothing previously whatever. The second report did not take place at the same moment, but there was scarcely any time elapsed. When I heard the first report, I cast my eye up to Mr. Hulett's house, expecting to see part of it fall down, and, by the time I had done that, there was an explosion at the other end. There was no other cause for that explosion that I am aware of. It might be that the gas ignited by the hot iron, but I cannot speak to it positively. I was mending the water-pipe. The gas-main was not injured where I was.

By the Jury: I was about 70 or 80 yards from the spot where the men were killed; just in front of Mr. Hulett's.

By the Coroner: I recollect Neal coming up to me, and saying that I was the cause of it. I do not know whether he had been at work near to me as there was a great many men at work, and I did not notice who they were. I noticed the dead main being taken up behind where I was. The first words Neal said to me when he came up were—"Go down on your knees, and thank God you are alive."

By the Jury: The gas-main where I was at work was bare. It was obliged to be so to allow of our getting to the water-service. It was the new main which the men had finished laying. When I was using my iron, there was a flash came out close to me, just as if you had pulled the trigger of a gun. When I looked up, there was a report at the other end, where the men were at work.

John Porter: I am a plumber's laborer, living in White Hart street, Drury lane. I was assisting Lee, the last witness, when the explosion took place. I was carrying metal to him to make a joint in the water-pipe. We had made one joint previously, and had finished the other, with the exception of using the hot iron. My partner called me to bring him the iron. I did so; and, as I was returning to the fire, the explosion took place. My fire was about eight feet from the main in the road. The second explosion was at the end of the main—by Featherstone buildings. I cannot say whether there was any hole in the main, as I was not in the trench. My partner was the person who did the joints; I only had to supply him with the iron and metal. I cannot say what was the cause of the explosion; but it took place immediately after I took Lee the iron.

By the Coroner: There was no smell of gas while we were preparing the joints.

By Mr. Tindal Atkinson: I was in the employ of Mr. Smith, who is a master plumber.

Mr. John Barr Brown: I am one of the house surgeons at this hospital. The deceased men were brought here a little before five o'clock. I did not see them myself till about six. Rawley was then in bed, and suffering from compound comminuted fracture of the lower jaw, and compound comminuted fracture of the right shoulder. He had also a slight wound on the forehead. He lingered for a couple of days, and then died from exhaustion, and the shock consequent upon the injuries he had received. At the time I first saw Morrissey, he was on the operating table. Both his legs were completely smashed, and he had a fracture and dislocation of the right wrist. It was found absolutely necessary to amputate both legs, which was performed the same day, while he was under the influence of chloroform. The amputation was well performed, but he only lived two days after the operation. He died from the exhaustion consequent upon the accident.

By the Jury: Before I saw Rawley, he had been partially attended to, his jaw having been set.

The Coroner: How are the other injured men going on?

Witness: One man has gone out to-day, and the other man is progressing favorably.

Mr. Tindal Atkinson: The surveyor to the Holborn Board of Works, who was on the spot five minutes before the accident, is present, if it is desired to examine him.

The Coroner: If he tenders himself as a witness, I shall be happy to hear him.

Mr. Crowder: I do not know that he can throw any light upon the subject; but we are anxious to afford every facility for obtaining information.

The Coroner: I should like to have some officer of the company examined.

Mr. Crowder: The consulting engineer, Mr. Jones, is here, and we will also call any one else you please.

Robert Jones, Esq., examined by Mr. Atkinson: I am the resident engineer of the Commercial Gas Company, and consulting engineer to the London Company. I am thoroughly conversant with the operation of opening streets, and laying and repairing gas-pipes, having had long experience in such matters. I have carefully listened to the evidence given to the jury to-day.

Mr. Atkinson: Are you able, from your practical knowledge and experience, to throw any light upon the cause of this unfortunate calamity?

Witness: In all these operations of laying mains and services, an india-rubber bag or "bladder," as the men term it, is employed, varying in size, according to the diameter of the pipe. A hole is drilled in the main, through which the bladder in a collapsed state is inserted. It is then inflated by the mouth, and the effect is hermetically to seal the pipe, and prevent the passage of the gas. [Bladder produced, and operation explained.]

The Coroner: But is it not an ascertained fact that, notwithstanding the use of these things, there is a considerable escape of gas in all cases?

Witness: No, it is not. I may just state, that I was engaged in the case of the great fire in Wood street, said to have been occasioned by the men of the Great Central Gas Company. There, all the scientific witnesses gave evidence to the effect that, if there had been a bladder inserted in the main, there would have been no escape of gas, and therefore no accident could have occurred.

By Mr. Atkinson: The company always supply their workmen with plenty of these things. The only way in which I can account for the accident is this—when the bladders are blown into the mains, there is a little brass tap, which is turned off to keep the bladders inflated. During the operations in Holborn, the workmen have been plagued by the children playing about in the neighborhood, and have had to apply to the police to keep them away. I imagine that the accident occurred through the brass stop-cock at the end of the elastic pipe on the bladder being interfered with, which caused the bladder to collapse to some extent, and the gas to escape. The workmen generally place a heavy stone over the hole, so as to prevent the tap being turned. About three minutes before the accident took place, the band of the Inns of Court Rifle Volunteers passed along the street, and if, as was possible, some of the people jumped into the trench, in following them, they might have disturbed the tap. In this case, a very small quantity of gas passing would cause an explosive mixture of a very destructive character. From seven to ten parts of atmospheric air to one part of gas, are necessary to form an explosive compound. Nine of the former to one of the latter, is about the strongest. Fortunately for the safety of our houses, the escape of gas is always very perceptible. I was very much surprised to hear the witnesses say that they smelt nothing prior to the explosion; but, it is a proof that very little gas had escaped. It was quite possible for the plumber's red-hot iron to ignite the gas—it does not require flame to do it. After the gas ignited, it would go thundering along the main until it met with the resistance of the plug at the other end, when there would be a violent explosion. It is quite necessary to repair the water-services while the work is going on, and, if the bladders are properly blown in, the main is to all intents and purposes hermetically sealed, and there is no danger. In fact, the men had been working in this way for weeks, without accident of any kind; and I can only account for the explosion by supposing there was some disturbance of the stop-cock at the moment, and that it might have been occasioned by persons jumping into the trench, or, by some mischievous boy turning the tap.

A Juror: Are there no means of securing these taps

so as to prevent the possibility of their being interfered with by children or others?

Witness: The gas company take every precaution to prevent it, and, in this case, they had a policeman stationed there to keep the children away.

A Juror: But, could there not be some machinery used—something of a cap to screw over the cock?

Witness: We all become wiser after an event—perhaps there might. Generally speaking, a heavy stone is put over the place, so as to prevent any mischievous person from interfering with it, but any one jumping suddenly upon the stone, might have disturbed the tap.

The Coroner: There is a scientific gentleman, a Mr. Simmons, present, who, I understand, has invented an apparatus which he calls a gas-connector, whereby such accidents as these may be prevented. He waited on me to explain his invention, and, as I think it is a matter of so much public importance, I propose that he should be called.

The jury having assented,

George Simmons, Esq., was called, and produced a model of his recently-patented gas and water-connector. He said, I am a civil engineer, of No. 7 New Palace yard, and am the inventor of this machine for preventing accidents in making connexions with mains and services. When a bladder is used in making such connexions, I believe, if it is fully blown, and her metically sealed, no gas will pass; but, in putting in the bladder, in the first instance, there is always an escape of gas, because a hole has previously to be drilled for its reception. My apparatus consists of a small box with a stuffing-gland, and a valve in the interior for shutting off the communication between the main and the atmosphere. When it is attached to the pipe for the purpose of connecting a service, the drill passes through the stuffing-box, so that there can be no escape of gas during the operation of boring the main. After the hole has been made, the drill is partially withdrawn, but left in the stuffing-gland. The tap is then inserted, and the valve is opened, so as to allow of the hole in the main being tapped. The tap is then removed in a similar way as the drill was previously, and the service-pipe is screwed in. The apparatus may be applied in laying mains along the street, and, in that case, no bladders need be applied, because the operation of the same machine I have referred to will effectually prevent any gas escaping. A fire may be placed round during the operation, and no danger need be apprehended.

The Coroner: Do you think the application of your machine would have prevented this accident?

Witness: Yes, it would. At the time of the accident, from what I have heard, there was a hole drilled in the main where the plumber was, and that hole was for the purpose of connecting a service-pipe to Mr. Hulett's house. It was from that hole the gas escaped.

The Coroner: But we are told there was a bladder inserted?

Witness: Still, there was a certain amount of gas that passed the bladder, which was lit by the plumber's iron, and that quantity was certainly more detrimental than if the main had been fully charged with gas. I think, if the main had been fully charged with gas, and it had caught light, there would not have been an explosion; the gas would have burned in a similar way to a common burner in a room. In this case, it became mixed with the air in the other portion of the main, and hence the explosion.

The Coroner: I am sure we are much obliged to Mr. Simmons for attending to explain his invention. I thought the public ought to have the information that there were means of preventing accidents of this kind.

Mr. Atkinson (to witness): You are aware that this accident did not occur while they were drilling the hole?

Witness: I believe the hole was already drilled.

Mr. Atkinson: It arose as explained by the engineer, probably from the tap being turned by accident or design, causing the bladder to collapse a little.

Witness: Yes, and there was a hole in the main where the service-pipe was being laid on. If this machine had been used in that instance, certainly no fire would have run into the main.

Mr. Atkinson: Has your instrument been applied at all?

Witness: Oh, yes, I have applied it in several instances.

George Bashford, recalled and examined by the Coroner: I did not mention that Neal came to me because I could not answer for the truth of what other parties said. I remember Neal saying that the plumber said he had done it. I went to the plumber, and made inquiry, but he gave me no answer. He had previously drawn my attention to a temporary connexion, which he wanted shifted, as it was in his way. I sent a man to do it and to make all secure.

The Coroner summed up the evidence, and left it to the jury to say whether this deplorable calamity was the result of accident or not. Having read some portion of his notes, and commented thereon, he said he thought the jury would have no difficulty in arriving at the conclusion that, however lamentable the result, it had arisen from an accidental circumstance, which could not have been prevented.

The jury consulted for a short time, and then returned a verdict of "Accidental Death," in both cases. The foreman said they desired to express their hope that the company would take every precaution to prevent a similar catastrophe. He suggested that a cap should be screwed over the stop-cock of the bladder, to prevent its being accidentally turned.

Mr. Atkinson: On behalf of the London Gas Company, I am instructed by the directors to say, that they most deeply deplore this unavoidable accident, and that every precaution which human care and forethought could suggest has been always taken by them. With reference to the families of the deceased men, the company will extend their sympathy to them, and do all in their power to alleviate the sorrow which their melancholy loss has occasioned. They have always looked carefully after the interests of their servants, and everything will be done by them in the present case which the public have a right to expect at their hands.

The Coroner: I am sure this communication will be very gratefully received.

A verdict of "Died from an Accidental Explosion of Gas," was then recorded in both cases, and the proceedings terminated.

CHEAP GAS MOVEMENT IN SCOTLAND.

The movement which the *Builder* originated some years since, and which has been so successful in England, and so advantageous to both the public and the gas companies, is now spreading with rapidity throughout Scotland. In no less than forty-five cities and towns, according to the Glasgow *Morning Journal*, the price of gas has already been induced, at an immediate saving to the community of fully £40,000 a year; and, we will venture to anticipate, at a future profit to the companies themselves of a still larger sum. The following list of reductions is given by the paper just named:

	Price reduced from s.	d.	to s.	d.
Airdrie	5	10	5	0
Aberdeen	6	8	5	10
Ayr	6	8	5	10
Alexandria	8	4	7	6
Auchtermuchty	9	2	8	4
Arbroath	6	3	5	5
Bathgate	8	4	7	6
Bonhill	8	4	7	6
Broughty Ferry	6	8	5	10
Blairgowrie	8	6	6	8
Coatbridge	6	8	5	3
Carluke	8	6	5	10
Cupar-Angus	9	6	7	6
Dunfermline	5	5	4	7
Denny	7	6	5	0
Dumbarton	6	8	5	3
Dunbar	9	2	8	4
Dundee	5	5	4	10
Edinburgh and Leith	5	5	4	10
Elgin	7	6	7	0
Forfar	7	6	5	10
Glasgow	5	0	5	10
Greenock	5	0	4	7
Galashiels	7	6	6	5½
Helensburgh	9	0	8	0
Jedburgh	9	0	6	8
Kirkcaldy	5	2	4	4½
Kilmarnock	6	8	5	10
Kirriemuir	8	4	6	8
Lanark	7	6	5	0
Manchester	5	0	4	0
Maryhill	6	8	4	7
Moffat	10	0	8	4
Montrose	5	10	5	5
Musselburgh	5	10	5	0
Portobello	5	10	5	0
Paisley	5	0	4	7
Perth	7	6	4	2
Rothesay	5	10	5	0
Strathaven	8	4	6	8
Stirling	6	0	5	0
St. Andrews	5	10	5	0
Wishaw	7	6	5	10

—*London Builder.*

EXPENSE OF LIGHTING TROY, N. Y.—The expense of lighting the city of Troy, N. Y., for the year 1861, was as follows:

Cost of gas and lighting gas-lamps	11,594 02
" fluid " " fluid-lanps	1,496 36
New fluid lanterns	138 00
Glazing lamps	403 02
Repairing "	159 68
	$13,971 08

TROY, N. Y., WATER-WORKS ACCOUNT FOR 1861.

Salary of Superintendent		700 00
Pay roll		2,949 73
Iron castings		420 03
Hydrants		57 00
Patterns		8 75
Paints, &c		13 83
Rent. water-power at dam		500 00
Fire department for pumping by steamers.		600 00
Printing and stationery		121 90
Bibs and cocks		169 75
Iron pipe		212 85
Lead pipe		849 49
Brass work		232 58
Lumber		190 78
Fuel		70 75
Hardware		149 26
Posts		50 00
Exchange stoves		10 37
Brunswick taxes		35 86
Carpenter work		55 06
Blacksmith work		48 50
Interest on debt		3,582 88
Water meter		56 50
Team work		64 76
Straw		19 26
Sundry expenses		111 21
Mason work		12 64
Insurance		16 60
Construction new reservoir		15,083 09
Care lake		70 75
		$26,464 18
Received for job work	4,050 08	
Water rates written in city tax books	18,667 08	
	$22,717 16	

TROY, N Y., WATER-WORKS DEBT FUND.

Balance in hand 4th March, 1861		1,171 96
Rec'd for coupons city 6 per cent. bonds		780 00
do. do. do. due 1st Jan. '63		150 00
do. do. 7 per cent.		140 00
Rent Female Seminary, 1860, from Chamberlain		1,024 91
do. do. 1861, do.		1,023 72
		$4,290 59
The Board has purchased city 6 per cent. bonds, due 1st January, 1863, for account of this fund		3,000 00
Leaving in hand a balance of		$1,290 59
The investments for account of this fund are in Troy city 6 per cent.		
bonds, due 1st Jan., 1863	$4,000	
do. do. 1st Apl., 1863	6,500	
do. do. do. 1867	6,500	
do. 7 do. do. 1862	2,000	
Balance March 4th, 1862	$19,000	

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THE

AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

PROPRIETOR, JOHN B. MURRAY. | EDITOR, C. ELTON BUCK.

MONDAY, JUNE 16, 1862.

While the last number of the JOURNAL was being printed, a great fire occurred in the adjoining city of Brooklyn, whereby a large amount of property was destroyed and several lives were lost. This conflagration, caused by the explosion of a quantity of petroleum which was being unladen, was particularly disastrous—the total loss amounting to over three hundred thousand dollars. From the suddenness of its occurrence, and the large amount of property destroyed, together with the frequent fires which have lately occurred in other places, occasioned by the careless handling or storing of crude petroleum, the public mind has evinced much alarm on the subject, and stringent measures have been demanded, whereby protection might be assured, and the repetition of similar casualties avoided. The action of insurance companies here and elsewhere has given additional impetus to the feeling of alarm, and unless a fair hearing be obtained for those who are immediately interested in this important enterprise, injustice may be done, and too severe measures enacted, to the injury of a very prominent branch of industry.

It cannot be denied that a number of disastrous fires have occurred in places where petroleum has been stored, and that explosions in refineries of this article, followed by conflagrations and loss of many lives, have taken place. Fatal casualties have likewise happened at the wells whence the crude article is raised, and all these facts have demonstrated the extreme danger to be apprehended when due precautions are neglected, or where downright carelessness is exhibited. But in the instances of these fires and explosions which have come under our notice, the origin of all was directly attributable to a most culpable disregard of ordinary precautions, and to carelessness almost amounting to criminality. In some instances the smoking of pipes and cigars where the atmosphere was surcharged with petroleum vapor caused the explosion, while in others lighted papers or matches were thrown into the inflammable liquid, as was the case in the fire at the Duquesne depot of the Pennsylvania Railroad Company in Pittsburgh, Pa., which is referred to in the letter of Mr. PEMBERTON, on page 197 of this volume.

Crude petroleum, as it is raised from the wells, is a mixture of hydrocarbons, of varying specific gravities, some of which are very volatile and convertible into vapor at the ordinary average temperature. This vapor when mixed with a certain proportion of atmospheric air is highly explosive, but the liquid itself is no more capable of explosion than alcohol. It is inflammable it is true, but when confined in proper receptacles may be transported and handled with perfect safety. It is now sent to market in wooden barrels. The subtile nature of the fluid causes it to penetrate the crevices of these barrels, and when it comes in contact with the air the volatile portions become vaporized, and mingled with the air, under which circumstances it is rendered explosive. But although this is the case, may not such precautions be adopted so as prevent the escape of the more volatile portions of the liquid from the casks and thus render accidents impossible? Or may not other receptacles than wooden barrels be provided for the oil—cases more impervious to the subtile fluid? These are questions of some importance, and a field is open to inventors which may repay them for investigating the subject. Silicate of soda has been suggested as a lining to the interior of petroleum barrels, and, we believe the use of this compound has been patented for this purpose, but we are not aware how the measure has succeeded practically. Metallic vessels would seem to be the only ones capable of being hermetically sealed, and thus preventing the escape of the volatile portions of the oil; but the question of cost is doubtless against their general adoption. In view of the great importance of the petroleum trade, and the impetus which this branch of industry has attained, we cannot but believe that some measures will be devised, whereby the danger now attending the storing of the oil will be lessened if not altogether removed. This will be rendered absolutely imperative, for the conviction of the perilous character of the substance is rapidly gaining ground, and enactments are being called for which will seriously hamper the business, if not render it unprofitable to be followed in large cities.

The recent fire in Brooklyn has had the effect of drawing the attention of the authorities in that city as well as in New York to the subject of the hazardous nature of petroleum, and the councils of both cities have passed resolutions to report ordinances respecting its storage. In cases of this kind, extreme measures are very likely to be resorted to, and, from pecipitate action, injustice done to the parties interested in the business. Apprehensive of this effect, a committee of persons interested in the petroleum trade in Brooklyn, have addressed the following letter to the Common Council of that city, which was presented at a regular meeting and referred to the Joint Fire Department Committee:

To the Honorable the Common Council of the City of Brooklyn:

The memorial of the undersigned, a committee of citizens interested and engaged in the storage and manufacture of petroleum, respectfully present:

That your honorable body, at its last meeting, adopted an ordinance in relation to petroleum, rock, or earth oil, which, without notice, at once prohibits its storage or manufacture under such conditions as entirely to prevent the operations in business of those whom the represent, constituting a large number of citizens of Brooklyn, and under the most severe penalties. Your honorable body, in order, it is believed, to give these citizens an opportunity of being heard before the ordinance should go into effect, passed at the same time a resolution instructing the Joint Fire Department Committee to hear the parties interested and to report if there were any cases which in its opinion ought to be excepted from the operation of the ordinance, and appointing Friday evening last for a meeting of that Committee to hear the parties, and making their report the special order for this evening. The parties so interested did attend in large numbers, but owing, as they understood, to unavoidable causes, the Committee were not able to form a quorum on that evening, and no opportunity, consequently, was afforded the parties of being heard, as intended by your honorable body. The undersigned having every confidence in the disposition of your honorable body, especially from the action fixing the meeting of the Committee, to give them a hearing before the ordinance should go into force, and such intention having been defeated, respectfully ask your honorable body to suspend the operation of the ordinance until such hearing shall be had and final action upon the report of the Committee by your honorable body.

(Signed) D. O. KETCHAM,
In behalf of the Committee.

It must be conceded that the requests contained in the above memorial are but reasonable, and in all fairness the committee should be allowed a hearing. The business in petroleum is of such importance, and daily expanding, that to pass a stringent ordinance merely under the impulse of alarm without affording all the interested parties an opportunity to express a word of remonstrance would be unjust in the extreme. We hope that a full and fair hearing will be granted, and then if the evidence proves that under all circumstances great risk attends the storage and transportation of petroleum, the public safety demands protection, and this should be afforded it even at the expense of the business interests involved. But we are of the opinion that no such sweeping regulations will be required. With prudence and vigilant care, we believe that petroleum may be safely handled, and if placed in proper receptacles it may be stored without any greater danger than now attends many other articles of daily use.

TO SUBSCRIBERS.

With this number the third year of our editorial existence is closed.

When the war broke out we were somewhat apprehensive that its effects upon the branches of industry represented in these columns would be disastrous to the JOURNAL, but strange to say, our circulation has positively increased, though the revenue from advertisements has somewhat lessened.

We commence the fourth year on a firm foundation, without large expectations as to profit, but entirely satisfied that a brilliant future is before us. Evidences of appreciation by our readers are many and frequent, and are always acceptable.

☞ *The subscription for the fourth year being due, the* JOURNAL *will not be sent until the amount* ($3 *per copy*) *is received.*

WATER-METERS.—The engineers of the various water-works, supplying our large cities, are becoming convinced of the great importance of the general introduction of the water-meter as a means of preventing waste. In the report of the Brooklyn, N. Y., Water Commissioners, of which an abstract will be found on another page, the increasing evil of wastefulness is mentioned, and the water-meter advocated as the true remedy. We have frequently reverted to this subject before, and we reiterate our remarks, being convinced that, ultimately, the mutual interests of water companies and their consumers will be benefitted by a general use of these valuable instruments. We hail the increasing confidence which is being exhibited in these meters as a step in the right direction, and hope soon to announce the fact of their being widely used, and water charges assessed by their indications. Equity and common sense alike point to the water-meter as the only proper means of determining the bills of consumers, and we hope this fact will be acknowledged and acted on by those most interested in the preservation of a pure and unlimited water supply.

CARELESSNESS OF GAS-FITTERS.—There are some gas-fitters, who, in order to save themselves the trouble of turning of the gas at the meter when attaching burners or fixtures to the pipe, perform this work and allow the gas to flow freely from the orifice while making the joint, only endeavoring to plug up the opening with the finger. In this way a large quantity of gas escapes into the air, and we may not be surprised at any time to hear of explosions caused in this manner. Housekeepers, in whose premises alterations are to be made, should always insist on the gas being turned off at the main cock at the service pipe, which is the only effectual way to prevent accidents. In dealing with a subtle substance like gas, too much care cannot be taken to guard against even the appearance of danger.

CORRESPONDENCE.

ON MR. JOHN C. CRESSON'S OPINION OF CLAY RETORTS.

Letter from the engineer of the Singapore (Asia) and West London Junction Gas-Light Companies to a distinguished gentleman in London:

London, May 28, 1862.

My Dear Sir,—'Tis amusing to hear that clay retorts wont do. Have we all on this side the water made a mistake, and doubled our dividends in imagination only? Most of us fancy it a reality, having the cash at our banker's. I cannot imagine Mr. Cresson's manner of experimenting with the clay retorts, but there is, no doubt, many English engineers of "position" made similar statements as Mr. Cresson, and even now Hawksley reluctantly acknowledges the value of clay retorts.

The Phœnix Gas Co., on their introduction, jumped from 3 or 3¼ per cent. dividend, up to 6, and progressively since, to ten per cent. The Chartered, after some years' nibbling at the tempting prize, at last were induced to pitch aside the limited old ladies' views, and in one year, followed the footsteps of the Phœnix, their shares rising within a few months from something about £35 up to £64. Can such results be ideal?

I wish you and I could run over to these American gas-makers; I think we could make a little capital out of them, if it was not that we have got a "*living*" on this side.

I think I must concoct a few remarks for the AMERICAN GAS-LIGHT JOURNAL on the subject; perhaps you might do the same, which might stir them up a little.

Yours faithfully,

R. M. C.

PETROLEUM AND WATER-GAS.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

Buffalo, N. Y., June 7th, 1862.

In your last issue I observe a letter from Mr. Gwynne, C. E., having reference to a circular taken from a Canadian paper you were kind enough to introduce into your columns a few weeks since. I beg to refer Mr. Gwynne to patent No. 35,336, J. E. Thomson, Washington May 20, 1862. If Mr. Gwynne is really an honorable man, he will read my specification and claim there recorded, and immediately withdraw the expression he has used in his letter in your issue of June 2d, and make the *amend honorable*. I shall be happy to meet any statement of Mr. Gwynne which you may permit in your columns, provided Mr. Gwynne adopts a manly style, and does not attempt to shelter himself by calling names, always a sign of weakness, if not of vulgarity. I do not fear open and legitimate discussion—in fact, I invite it—but it must be conducted in a gentlemanly manner or I shall decline to enter the lists. Mr. Gwynne must confine himself to facts, and if he is as confident as I am, he will remember the old proverb in future, "not to holla until he's clear of the wood."

Yours respectfully,

JAS. E. THOMSON.

ILLUMINATING GAS FROM PETROLEUM.

In the AMERICAN GAS-LIGHT JOURNAL of May 15th, may be found, under the above caption, a circular of a Mr. Thompson, of Toronto, describing what he claims to be a new method of manufacturing gas from petroleum invented by him, and patented in Canada.

As both the process and apparatus described by Mr. Thompson are, in reality, inventions of citizens of the United States, justice to our own inventors requires that the following facts should be published, to correct the false inferences which otherwise might be drawn from Mr. Thompson's circular.

1st. The process of introducing oil, or other liquid hydrocarbons, in connection with steam, into one retort containing coke or charcoal, so that the gases formed may mix in their nascent state, was used by N. Aubin, of Albany, N. Y., in various works erected by him under a patent granted to him by the United States September 26, 1854, and since then has been used by Dr. Sanders, of Cincinnati, Ohio, and is sometimes known as the water-gas process. The mere substitution of petroleum, in this process, for other oils, is no invention, and if it were, the right to it would not be in Mr. Thompson, as, before the discovery of petroleum in Pennsylvania, crude oil, obtained from the distillation of coal, was used for gas-making here, and very soon after that discovery, petroleum was substituted as a cheaper material, and, to the writer's knowledge, has since been, and still is, used in various gas-works in the United States.

2d. The apparatus used by Mr. Thompson, and called a compound retort, from his description, would seem to be an old form of the Aubin Works, as patented in Canada December 10th, 1856, viz., a retort with a steam generating chamber, cast on, and connected with it. Otherwise than the steam attachment, as the writer has been informed, it consists of the retort used in the gas-works of the Maryland Company, with the addition of the movable cover and fusible metal joint for closing it, peculiar to the Aubin Works, and patented both in this country and in Canada. Not only, therefore, is there no novelty in Mr. Thompson's apparatus, but it is a violation of the rights of others for which he should be held responsible. The fact of his having a patent in Canada means nothing, as, under the laws of that Province, *all* applications for patents are granted, the question as to validity, infringment, &c., being at the risk of the applicant, and left to be decided by the courts.

As to the value of petroleum for gas-making, too much cannot be said in its praise. In using it for that purpose, however, certain conditions must be observed, or the disadvantages will more than compensate for the gain. For instance, it cannot be used profitably when run into the retort in connection with steam upon coke or charcoal, as the intense heat required to render that process effective will soon destroy the retort, and, in practice, requires too much care to keep it up. On the other hand, if a less degree of heat is used, the coke soon cools, and, as a necessary consequence, little fixed gas is obtained, but much heavy vapor, which condenses in the mains, clogs up the burners, and, what is more injurious, affects the valves of the meters, thus rendering their registry unreliable. Again, the gas, when undiluted, is so rich in carbon, that it will smoke if consumed in the ordinary way. Burners using only one to one and a half feet per hour, therefore, must be used, which rate of consumption would be ruinous to any company.

Doubtless there are various ways of adapting to the use of petroleum, gas-works now using coal, rosin, &c. To make them effective, however, they must overcome the above difficulties. How far other methods have done so is unknown to the writer, but that used by him in his experiments gives the following results, viz.: 20 feet to the pint, or more than 150 feet to the gallon when petroleum is used, and when the residuum oil, left after its first distillation, is used, 100 feet to the gallon. In neither case is there any deposit in the retort. (For an explanation of the method here referred to, see note at the end.)

These results prove that no material can compete with petroleum for gas-making, but without the addition of a method lately employed to dilute the gas without diminishing its specific gravity, its great richness would prohibit gas-light companies from using it. This method consists in mixing atmospheric air with the gas in the main after it has left the gas-holder, and previous to its combustion in the burners. Thus mixed with air in the proportion of 40 per cent. of air to 60 per cent. of gas, the mixed gas can be, and in several village gas-works now is, burnt under the conditions observed where rosin gas is used, and gives a most magnificent light, and still is so rich that an equal quantity of it photometrically tested, will burn longer and give more light than rosin gas does.

It will be remarked that the proportions observed in the above mixture prevent its being explosive—gas requiring from 7 to 14 times its bulk of air mixed with it to make it explosive, and the air mixing apparatus being easily arranged so that at least 50 per cent. of what passes through it is gas.

As a final comment upon the above facts, the writer adds, that he is now arranging to use the residuum oil from the distillation of petroleum, (costing, when barrels are furnished, 2 cents per gallon,) and the air-mixing process above referred to, in a number of gas-works in which he is interested, as the only means known to him to enable them to compete with kerosene. H.

NOTE.—In the patented gas-works used in the above experiments, the oil is run through a syphon into the retort *directly* upon its red-hot bottom, and not upon coke or other intervening substance, the effect of which would be to keep it from the source of heat. Then, by an arrangement in the retort, the vapor, as soon as formed, is quickly expelled from it, before it has time to deposit on, or crust the retort, and, in its passage out, is compelled to pass over (in a stratum of 1-50 of an inch in thickness) the hottest parts of the retort before it can escape. For the economic conversion of rich hydrocarbon vapors into fixed gas this is a necessary condition, as they are only so converted when, and as far as, they come into actual contact with iron, fire-clay, coke, &c., at a cherry red heat. Such portion as is not so subjected must pass over as vapor, and is condensed into tar, &c., in the mains.

GAS FROM PETROLEUM.

The process for the manufacture of gas from petroleum recently patented in the United States and Canada by James E. Thomson, of Buffalo, is the joint invention of Mr. Thomson and Professor Hind, of Trinity College, Toronto. The process involves a new principle in gas-making, namely, the introduction of water in a spheroidal state, into a chamber filled with volatile hydrocarbons. When petroleum is distilled alone or in the presence of steam, many condensible hydrocarbons pass over, which are not converted into permanent gases, and on cooling, are condensed into a liquid state in the hydraulic main and service pipes. By bringing these condensible hydrocarbons into a chamber heated to over 1000°, and subjecting them to the action of the intensly heated vapor surrounding a spheroid of water in the chamber, they are decomposed and converted into permanent gases. One of the remarkable properties of water in its spheroidal state is, that each spheroid is surrounded by vaper of nearly the same temperature as the plate on which it rests, or of the atmosphere into which it is thrown, so that if the plate is red hot, the temperature of the vapor enveloping the spheroid, is about 1000 degrees. The new process is shortly to be tried at Homer, N. Y., and two retorts capable of giving 500 feet of gas each, per hour, have been erected in that city. A number of practical gas men are expected to be in Homer at the time of opening the works, and their opinion will be looked for with much interest. As soon as the works at Homer are in operation, we are promised the details of the process and of the apparatus employed.

SEWAGE OF TOWNS.—The Parliamentary Committee appointed to consider the best means of utilizing the sewage of towns and cities, and applying it to agricultural purposes, met again on Thursday, May 1st; Dr. Brady in the chair. The other members present were Mr. Paget, Mr. Gregson, Sir F. Smith, Mr. Caird, Mr. Gore Langton, Col. Fane, Mr. Du Cane, and Mr. Ayrton. Mr. Blackburn, who has visited various parts of the country, and examined the sewage, stated that on his farm in Cardiganshire, 2,000 tons of sewage produced £40 per acre in Italian rye-grass. By means of pipes, the sewage did not cost him more than three farthings per ton, for conveyance of from a quarter to half a mile. By water-carts, it would cost 3½d. per ton. Liquid manure produced a greater effect than guano. It was very valuable for root crops; no other manure could compete with sewage for the production of grass. Mr. Fenton, engineer of the Local Board at Croydon (formerly of Chelmsford), said the system of drainage at that place was by pipes. It was strained, and the solid matter was taken out of the tanks. The liquid manure has been applied most advantageously to a farm of 240 acres. After paying all expenses, it left a clear profit of £1 per acre. The solid matter, amounting to about 100 tons per month, was sold at 1s. 6d. per ton. In some cases he believed sewage would be worth £20 per acre. He considered pipes better than open sewers for conveying the sewage to the land; but when it arrived at the land, it was better to use open water-courses than pipes, for distributing it. The Committee then adjourned to the 5th of May. —*London Builder.*

PHOTOMETRY.

Had we no other means of determining the illuminating power of gas than that by analysis, which requires the careful manipulation of an experienced chemist, and now, for the first time, photometry was introduced to the gas engineer, as a convenient and simple method of determining the relative illuminating power of gas, a test easily applied and sufficiently accurate for all practical purposes, we would suppose the photometer would be sought after and adopted by all gas companies.

The value of this instrument would be obvious to the engineer—he would say that now he had a guide to determine his operations. Heretofore he had worked by guess, and did not know but by some erroneous method he may have injured the illuminating properties of his gas, which a few simple changes in the process would correct; he would have a guide in the selection of coal and find that the yield of gas from coal was not alone the true criterion of value, as some coals yield less gas but of a higher illuminating power. He would learn that he could not make good gas from wet coal, and the necessity of protecting it from the weather. By experiment and frequent tests he may discover that a too copious use of water, in purifying his gas, takes from it some of its light-giving properties; that when the condensers are subjected to a temperature of 40° Fahr., or lower, the illuminating power of the gas is decreased, hence the advantage of having the condensers inclosed so that he may regulate his temperature at pleasure, and thus prevent, in a considerable degree, the condensation of hydrocarbon vapors, which at a higher temperature pass off with the gas and add greatly to its photogenic effect. These are some of the benefits of the photometer to the engineer. To the gas company, it teaches the intrinsic value of the article they vend, and thus enables them to reply understandingly to their customers when inquiries are made or doubts expressed respecting the value of the light as an illuminating agent. It enables them to experiment with burners and to adopt those best adapted to the gas, and especially the burners best fitted for street lamps.

But the photometer has not been recently introduced; it has been known, in its more improved form, for several years; still, but few gas-works have introduced the apparatus,—they cannot have appreciated its merits.

Photometry is not an exact science, and probably never will be, but when carefully conducted by combining and averaging observations the results are sufficiently accurate for practical purposes. The Rumfort shadow test, so called, invented by Lambert, enabled the operator to guess at the relative value of the lights; Doctor Ritchie's photometer approximated more nearly to true results; to Alfred King, engineer of the Liverpool United Gas-Works, gas companies are indebted for introducing Professor Bunsen's photometer, to which Mr. King has added the delicate governor, his pressure gauge, the minute clock, the candle balance, and his system of operating. Mr. King says: "By multiplying the number of observations, a compensation is made for the varying light of the candle and the errors of observation are very much reduced, if not annihilated, as it may be presumed that there will be as many plus as there will be minus." "I have a strong impression that accuracy in this, as in very many similar investigations, is only to be obtained by an extensive system of averages." "Every one experiences the difficulties arising from the difference in color in the light of a candle when compared with that of gas; this evil exists in the use of the Bunsen Screen, so that the two sides can never be said to be precisely alike; all that can be done with such imperfect instruments, is to reduce the errors by increasing the number of the observations." The foundation of all we know on this subject rests on the information obtained directly or indirectly from Mr. King. Previous to the introduction of his system of operating, the best practice of photometry was unreliable. The table for graduating the photometer bar, prepared by Mr. King, may be found in the London *Journal of Gas-Lighting*, vol. 6, page 7.

In the AMERICAN GAS-LIGHT JOURNAL, September 1st, 1859, (vol, 1, p. 39,) is a correct formula for graduating the bar. On page 58 of the same volume, is an article on photometry, improperly headed and indexed "Graduating the Photometer Staff." Knapp's Technology succintly states the principle by which light is estimated, in the following words: "Light cannot be measured or weighed like ponderable matter; it is not possible, therefore, to estimate how much light a flame emits, but it can be ascertained how much more or less intense the light from one flame is, as compared with that of another.

"All determinations of this nature are therefore comparative. The most casual observation of two flames of equal size—for example, that of a gas-burner and a candle—shows the one to be much more intense than the other. The eye is more powerfully affected by the gas flame; it is said to be brighter; and the impressions produced are attributed to the relative *intensities* or *illuminating powers* of the flames. The relations of intensity between two sources of light are considered as a measure for the quantity of light when the time is taken into consideration, or express the relation of quantity, when the time in both cases is the same. The dissemination of light being entirely effected by radiation, the intensity is said to express the sum of the rays which are emitted to a certain surface, for example, to a square foot. It is evident that the number of rays must diminish with the distance from their source, as the rays diverge and separate more and more from each other.

"According to the law of optics, the intensity (or sum of impinging rays) from any source is inversely as the square of the distance from their source; when, therefore, a surface is illuminated to the same extent by two flames, the number of rays of light from each will be proportional to the square of the distance at which each flame must be placed in order to produce an equal amount of light." "The squares of these distances give the relative intensities of light; if a flame, for example, has been three times as far removed as another, its intensity will be to that of the latter as 3^2 to $1^2 = 9 : 1$, or 9 times greater. As such observations are simultaneous, and of like duration, they give likewise the relative quantities of light; for unequal lengths of time, this has only to be multiplied with the repective durations."

The photometer room ought to be well ventilated, of sufficient size to hold the apparatus and allow the gas-burner and candle to be at least five feet from either wall; the walls and ceilings must be colored a dead black, to prevent reflected light as much as possible, and means provided for excluding the external light. Mr. King uses a photometer bar 140 inches long to test gas with gas, and a bar 100 inches long to test gas with candle; this bar he divides so that the divisions represent candles and parts of candles. The writer uses a bar 125 inches long, divided into 100 equal parts numbered from one to one hundred; these divisions are each subdivided into ten parts, so that the bar is divided into 100 equal parts; each of these divisions will be $\frac{1}{8}$ of an inch and represent 10ths on the scale and table which is calculated for these divisions; the centre of the candle socket, or of the candle, coincides with zero on the bar, and the gas pillar and burner has its centre at the 100th division, so that the distance from the centre of the gas-burner flame to the centre of the candle flame is 125 inches; the socket for the candle slides vertically so as to adjust the candle that the summit of the dark internal cone of the candle may be as high as the centre of the screen.

The disc which slides on the bar (which is horizontal) has a pointer which indicates on the scale the precise position of the paper screen. This screen is covered with a slightly conical blackened cap on each side of it, with two sight-holes, one on each side of the disc; these sight-holes ought not to be covered with glass as they sometimes are, as the glass obstructs the vision. Instead of making the paper screen translucent at the centre, by means of spermaceti dissolved in naphtha, it is better to adopt Dr. H. B. Leeson's plan: his screen consists of a piece of white paper, with a cream tint, in which he cuts out a hole the size of an half dollar, at the centre; this is placed between another piece of thin finely made paper, of the same tint, which is folded round it so as to cover it with a uniform thickness at each side. This screen is more sensitive and to be preferred to the greased one; the centre paper, however, should be much thicker than the paper folded round it.

A service pipe, exclusively for the use of the photometer room, should be connected in the room with a gas-regulator, so that the experimental meter (which ought to be a dry meter) is supplied with gas at a uniform pressure; on the meter should be placed a gauge to indicate this pressure; the outlet of the meter is connected by means of a tube with King's governor, thence it is connected with the gas pillar, and also with King's pressure gauge; this gauge indicates tenths, but by which an hundreth of an inch may be estimated; this gauge indicates the pressure at the burner. In a convenient place must be fixed a minute clock, the two hands of which denote minutes and seconds, and it strikes on a bell every minute; also, a thermometer. A pair of scales to weight the candle complete the apparatus; these scales have on the upper part at the end of the beam, vertically over the point where one scale is suspended, a candle socket. All the stagnant gas ought to be burned out of the meter and apparatus; the gas-burner (the pipe to which the mercury cup is attached which holds the burner should pass through a stuffing box) is adjusted so that a horizontal line bisecting the flame would pass through the centre of the screen, and the pressure is also adjusted by taking from or adding weights to the end of the beam of the governor. The best sperm candles, 6 to the pound, should be used; these are cut in two equal parts; either one is lit and allowed to burn till it forms a cup; the clock is set in motion; the candle is placed on the balance and counterpoised by placing fine shot or sand in the opposite scale; this should be balanced just as the clock strikes; the candle is carefully transferred to the socket at the end of the photometer bar and the time noted in the photometer book; the candle is then adjusted, the wick bending in a line paralled to the screen; the state of the meter is noted the first minute after the time of the candle was taken and the time noted. The scren is moved towards the gas-light until the centre spot appears dark, then moved towards the candle till the lights are equal and the position of the screen noted; the screen is then moved back towards the gas-light and again adjusted; this is repeated until at least ten observations have been recorded during the lapse of ten minutes; at the close of the experiment, a second before the clock strikes, touch the end of the candle slightly with sperm, and as the clock strikes blow it out and note the time; as the clock strikes one minute after this, note the state of the meter and the time. The candle is then replaced on the balance and weights placed in the scale below the candle till it is exactly balanced; these weights give the weight of candle consumed during the operation, and the weight of candle in the time is reduced to grains per hour. Now you have all the data for determining the relative illuminating power of the lights.

The mean of the ten recorded distances from the scren to the candle is taken, and by reference to the table calculated for this bar, find the number of these candles the gas-light equals; the consumption of grains of candle per hour is then multiplied by the number of candles found, this will give the combustion of candle in grains per hour equal to the light of the gas-burner. This product divided by the exact consumption of gas per hour will give the grains of candle equal to the combustion of one cubic foot of gas, and this again divided by 120 (the grains in a standard candle) will give the number of standard candles equal to one cubic foot of gas.

Here is a copy of the photometer book showing how the statement is made: The meter indicates $\frac{1}{600}$ of a foot, an observation of one minute shows the rate per hour.

Jan'y 22, 1861. Judd's sperm candle. Temp. 49½°. Steatite fish-tail burner.

Candle weight.....	8 minutes.	
Extinguished.....	18	"
22 grains consumed in.....	10	"
132 grains per hour.		
Time, 9 minutes; state of meter,		27.3
End, 19 minutes; state of meter,		17.9
10 minutes.		50.6

Rate of meter per hour, 5.06.

Reading of the photemeter bar divisions from candle:

19.1 Pressure 0,425 inches of water.
19.1
19.
19.
18.6
18.4
18.4
18.2
18.
18.2

186. Mean 18.6=19.152 candles of 132 grains.

$$\left(\frac{81.42}{18.62} = 19.152\right)$$

19.152 candles x 132 grs. candle per hour = 2,528,-064 grains of candle per hour, divided by 5.06 consumption of gas per hour, equal 499.6 grains of candle equal to 1 foot of gas; this divided by 120 gives 4.163 standard candles equal to 1 foot of gas.

5 feet of gas per hour equal 20.815 standard candles.

While operating, all currents of air ought to be stopped, even the presence of any one with the operator is objectionable, as the air should be kept as still as possible. If the candle should gutter or waste, the operation must be repeated with a fresh candle. The uncertain light of a candle is an objection to it as a standard; we rarely find one that will give the same light for ten consecutive minutes. It is convenient to have a black serge cloth to screen the eyes of the operator from the lights when adjusting the screen. We see frequently in print a statement calculated to mislead a tyro in photometry; it is this: "The disc must be moved to and fro, until that point is reached at which the central spot disappears, or when it presents the same aspect when viewed from either side."

Now the operator may move the disc until he is disgusted with the whole business; in comparing gas flame with candle, the central spot never disappears from both sides at the same time, and if he estimates the light from the point at which it disappears from one side, it is not the true point—the two sides of the disc can never be precisely alike. The candle casts a brown shade on the disc, and the gas a white or blueish white shade. These different colors prevent the two sides from being similar.

In testing to ascertain the daily or weekly quality of gas, it would be well to select a burner and pressure with which the gas will give the best results, when burning from 4 to 5 feet per hour, and make all the tests with the same quality of candles and the same burner and pressure.

The Steatite fish-tail burner will generally be found the best for the purpose.

Place the disc near the flame, the translucent spot on the side next the gas will show a dark spot, this spot gradually becomes lighter as the screen is moved towards the candle and finally disappears, and this side of the disc presents a uniform appearance; but when viewed on the candle side a luminous spot may be distinctly seen; precisely the same effect is produced by placing the disc near the candle and moving it towards the gas; the point at which the lights are equal is between these two vanishing points; move the disc towards either flame till an equal quantity of light may be seen through the translucent spot when viewed from both sides; due allowance must be made for the contrast caused by a brown color on the one and a white or blueish-white color on the other side of the screen.

With a screen prepared with fine thin paper for the external parts, the instrument is extremely sensitive, and the operator will soon learn to approximate to the exact position where the lights are equal. After understanding the *modus operandi*, practice is the best teacher. C.

Louisville, Ky.

PHOTOMETRICAL TABLE,

Calculated by R. G. C., Louisville, April, 1856, *for reading the bar of a Photometer, divided into* 100 *equal parts, each part subdivided into tenths. The candle fixed at zero on the scale, the gas-burner at* 100.

Distance of candle from screen.		Gas-light equal to candles.	Distance candle from screen.		Gas-light equal to candles.	Distance candle from screen.		Gas-light equal to candles.	Distance candle from screen.		Gas-light equal to candles.	Distance candle from screen.		Gas-light equal to candles.	Distance candle from screen.		Gas-light equal to candles.
15.	equal	32.111	21.	equal	14.150	27.	equal	7.310	33.	equal	4.121	39.	equal	2.446	45.	equal	1.494
.1	"	31.613	.1	"	13.982	.1	"	7.236	.1	"	4.086	.1	"	2.429	.1	"	1.482
.2	"	31.154	.2	"	13.816	.2	"	7.163	.2	"	4.050	.2	"	2.410	.2	"	1.470
.3	"	30.647	.3	"	13.651	.3	"	7.091	.3	"	4.013	.3	"	2.390	.3	"	1.458
.4	"	30.182	.4	"	13.490	.4	"	7.020	.4	"	3.976	.4	"	2.370	.4	"	1.447
.5	"	29.720	.5	"	13.331	.5	"	6.950	.5	"	3.940	.5	"	2.350	.5	"	1.435
.6	"	29.286	.6	"	13.174	.6	"	6.881	.6	"	3.906	.6	"	2.330	.6	"	1.424
.7	"	28.829	.7	"	13.019	.7	"	6.813	.7	"	3.872	.7	"	2.310	.7	"	1.413
.8	"	28.480	.8	"	12.868	.8	"	6.745	.8	"	3.837	.8	"	2.290	.8	"	1.401
.9	"	27.977	.9	"	12.718	.9	"	6.678	.9	"	3.802	.9	"	2.270	.9	"	1.390
16.	equal	27.562	22.	equal	12.570	28.	equal	6.612	34.	equal	3.768	40.	equal	2.250	46.	equal	1.378
.1	"	27.156	.1	"	12.424	.1	"	6.547	.1	"	3.736	.1	"	2.232	.1	"	1.367
.2	"	26.758	.2	"	12.281	.2	"	6.482	.2	"	3.704	.2	"	2.215	.2	"	1.355
.3	"	26.370	.3	"	12.140	.3	"	6.419	.3	"	3.671	.3	"	2.197	.3	"	1.344
.4	"	25.985	.4	"	12.001	.4	"	6.356	.4	"	3.638	.4	"	2.179	.4	"	1.334
.5	"	25.608	.5	"	11.864	.5	"	6.294	.5	"	3.606	.5	"	2.161	5	"	1.323
.6	"	25.241	.6	"	11.729	.6	"	6.233	.6	"	3 775	.6	"	2.143	.6	"	1.313
.7	"	24.880	.7	"	11.596	.7	"	6.172	.7	"	3.544	.7	"	2 125	.7	"	1.303
.8	"	24.522	.8	"	11.464	.8	"	6.112	.8	"	3.512	.8	"	2.107	.8	"	1.293
.9	"	24.143	.9	"	11.333	.9	"	6.053	.9	"	3.481	.9	"	2.089	.9	"	1.282
17.	equal	23.837	23.	equal	11.208	29.	equal	5.994	35.	equal	3.449	41.	equal	2.071	47.	equal	1.272
.1	"	23.502	.1	"	11.082	.1	"	5.936	.1	"	3.420	.1	"	2.055	.1	"	1.262
.2	"	23.174	.2	"	10.963	.2	"	5.879	.2	"	3.391	.2	"	2.038	.2	"	1.253
.3	"	22.852	.3	"	10 828	.3	"	5.822	.3	"	3.361	.3	"	2.022	3	"	1.243
.4	"	22.535	.4	"	10.715	.4	"	5.766	.4	"	3.331	.4	"	2.005	.4	"	1.234
.5	"	22.224	.5	"	10.597	.5	"	5.711	.5	"	3.301	.5	"	1.989	.5	"	1.224
.6	"	21.919	.6	"	10.480	.6	"	5.657	.6	"	3.273	.6	"	1.973	.6	"	1.214
.7	"	21.620	.7	"	10.365	.7	"	5.603	.7	"	3.245	.7	"	1.956	.7	"	1.204
.8	"	21.326	.8	"	10.250	.8	"	5.549	.8	"	3.217	.8	"	1.940	.8	"	1.194
.9	"	21.047	.9	"	10.139	.9	"	5.496	.9	"	3.188	.9	"	1.923	.9	"	1.184
18.	equal	20.753	24.	equal	10.028	30.	equal	5.444	36.	equal	3.160	42.	equal	1.907	48.	equal	1.174
.1	"	20.475	.1	"	9.919	.1	"	5.392	.1	"	3.132	.1	"	1.892	.1	"	1.164
.2	"	20.201	.2	"	9.810	.2	"	5.341	.2	"	3.106	.2	"	1.877	.2	"	1.155
.3	"	19.944	.3	"	9.704	.3	"	5.290	.3	"	3.079	.3	"	1.862	.3	"	1.146
.4	"	19.667	.4	"	9.600	.4	"	5.240	.4	"	3.053	.4	"	1.847	.4	"	1.137
.5	"	19.407	.5	"	9.496	.5	"	5.191	.5	"	3.027	.5	"	1.832	.5	"	1.128
.6	"	19.152	.6	"	9.394	.6	"	5.143	.6	"	3.	.6	"	1.817	.6	"	1.119
.7	"	18.901	.7	"	9.294	.7	"	5.095	.7	"	2.976	.7	"	1.807	.7	"	1.110
.8	"	18.656	.8	"	9.194	.8	"	5.047	.8	"	2.950	.8	"	1.787	.8	"	1.101
.9	"	18.412	.9	"	9.097	.9	"	5.	.9	"	2.925	.9	"	1.772	.9	"	1.092
19.	equal	18.174	25.	equal	9.000	31.	equal	4.954	37.	equal	2.899	43.	equal	1.757	49.	equal	1.083
.1	"	17 940	.1	"	8.904	.1	"	4.908	.1	"	2.874	.1	"	1.743	.1	"	1.074
.2	"	17.710	.2	"	8.810	.2	"	4.863	.2	"	2.850	.2	"	1.728	.2	"	1.066
.3	"	17.481	.3	"	8.718	.3	"	4.818	.3	"	2.826	.3	"	1.715	.3	"	1 058
.4	"	17.261	.4	"	8.426	.4	"	4.773	.4	"	2.802	.4	"	1.701	.4	"	1.049
.5	"	17.042	.5	"	8.536	.5	"	4.729	.5	"	2.778	.5	"	1.688	.5	"	1.040
.6	"	16.826	.6	"	8.446	.6	"	4 686	.6	"	2.754	.6	"	1.674	.6	"	1.032
.7	"	16.615	.7	"	8.357	.7	"	4.643	.7	"	2.731	.7	"	1.661	.7	"	1.024
.8	"	16.407	.8	"	8.271	.8	"	4.600	.8	"	2.708	.8	"	1.647	.8	"	1.016
.9	"	16.201	.9	"	8.184	.9	"	4.557	.9	"	2.685	.9	"	1.634	.9	"	1.008
20.	equal	16	26.	equal	8.101	32.	equal	4.515	38.	equal	2.662	44.	equal	1.620	50.	equal	1.000
.1	"	15.801	.1	"	8.016	.1	"	4.474	.1	"	2.639	.1	"	1.607			
.2	"	15.606	.2	"	7.934	.2	"	4.433	.2	"	2.617	.2	"	1.595			
.3	"	15.414	.3	"	7.853	.3	"	4.392	.3	"	2.595	.3	"	1.581			
.4	"	15.225	.4	"	7.772	.4	"	4.352	.4	"	2.576	.4	"	1.569			
.5	"	15.039	.5	"	7.692	.5	"	4.313	.5	"	2.551	.5	"	1.556			
.6	"	14 856	.6	"	7.613	.6	"	4.275	.6	"	2.530	.6	"	1.544			
.7	"	14 676	.7	"	7.536	.7	"	4.237	.7	"	2.509	.7	"	1.531			
.8	"	14.498	.8	"	7.460	.8	"	4.199	.8	"	2.488	.8	"	1.519			
.9	"	14.324	.9	"	7.384	.9	"	4.160	.9	"	2.467	.9	"	1.506			

EXPLANATION.

If the disk of the Photometer is vertically over 18.3, and the disk appears the same, or nearly so, on each side, then the gas-light is equal to 19. $\frac{944}{1000}$ candles, and so of all the distances.

C.

PATENTS.

UNITED STATES

35,118.—Thomas Tripp, of Amsterdam, N. Y., for Improved Water Wheels:

I claim, first. The conic form or shape of the center of this wheel, as applied to water wheels.

Second, The extension of the lower middle point of the main buckets, C C, Fig. 1, at the point 1, so as to receive the inclined auxiliary buckets, as represented.

Third, The curvature of the inner bottom edges of the main buckets, as represented in Fig. 1, by the red dotted lines.

Fourth, The curved and V-like shape of the inclined auxiliary buckets to water wheels, as represented by b b b b, Fig. 2.

Fifth, The scallop or concave of the lower edges of the bottom of the inclined auxiliary buckets, as applied to water wheels—the different curves of the parts of the wheel being arcs of the same circle as the circumference of the entire wheel.

Sixth, Inclined-curved auxiliary buckets, attached to curved or concavo-convex main buckets, conforming to the curvature of said main buckets.

35,122.—I. A. Williams, of Utica, N. Y., for Improvement in Locomotive Lamps:

I claim the perforated cylinders, E F, one or more, in combination with the cap or deflector, G, and hollow wick tube, C, arranged substantially as and for the purpose specified.

I further claim the perforated cylinders, E F, one or more, cap or deflector, G, perforated hollow base, K, provided with the perforated cap, L, in combination with the hollow cylindrical wick tube, C, all arranged for joint operation, substantially as and for the purpose set forth.

35,144.—O. P. Drake, of Boston, Mass., for Improved Apparatus for Carbureting Air:

I claim the combination as well as the arrangement of a vaporizer, an air-forcing apparatus, and an airometer, the whole being constructed to operate together, substantially as described.

I also claim the specified arrangement of the vaporizer, and the air-forcing apparatus, whereby the shaft of the rotary frame of the vaporizer may be connected to, and put in motion by, the shaft of the rotary drum of the air-forcing apparatus.

I also claim the air-inlet box, Q, as made and applied to the case, A, and its shaft, and as provided with a pipe, R, to operate as specified.

I also claim the combination of the auxiliary air pipe, S S, with the aerometer and the vaporizing and aerating apparatus, substantially as described.

I also claim the combination of the annular air vessel, g g, with the aerometer, when combined with a vaporizer and an aerating apparatus, as specified.

35,146.—Jacob Edson, of Boston, Mass., for Improvement in Gas Regulators:

I claim, first, The combination of the floating disk or diaphragm, d, and hollow die cut-off or valve-rod, h, with any suitable shaped receptacle or reservoir of the induction pipe, for the purpose specified, and arranged therein, and operating substantially as described.

Second, Constructing the cut-off in a hollow shape, by means of which it can be readily increased or lessened in weight, at pleasure, for the purposes set forth.

Third, The adjustable rod, m, or its equivalent, for the purpose described.

Fourth, In so constructing the die cut-off, and arranging it in the induction aperture of the apparatus, that when pulled or forced up through the same, it will scrape or cut off the coal tar, &c., deposited or collected upon their surfaces.

35,151.—William Fulton, of Elizabeth City, N. J., for Improved Coal-Oil Lamp Cone:

I claim, first, The perforated spring plate, D, as shown, or its equivalent, for regulating the elastic force of the air, so that it may be presented evenly to the flame, and as a rest, which accommodates itself to the bottom of the chimney.

Second, I claim the construction of cone, B, as shown, in combination with the perforated shell, K, as shown, and the gauze wire, P, as shown, the whole being arranged substantially as and for the purpose set forth.

35,154.—T. W. Houchin, of Morrisania, N. Y., for Improvement in Night Lamps:

First, I claim the use or employment of a wick sustainer, constructed as shown in Fig. 3, C, for the purpose specified.

Second, I claim the use or employment of the wick sustainer, as shown in Fig. 3, C, in combination with the stand, A, lamp, C, taper, E, and shade, F, when the same shall be combined and operated for the purpose shown.

Third, Combining a wick sustainer, I, constructed as shown in Fig. 4, with a circular float, J, of cork, or other suitable material, for the purpose described.

35,157.—H. C. Hutchinson, of Cayuga, N. Y., for Improvement in Burners for Lamps:

First, A central draught entering above the lamp, through the lateral air tubes, E E, leading to the inner chamber, G, closed at the bottom, and surrounded by the wick at the top.

Second, The perforated basin, C C, so constructed as to cause a counterpoise air pressure against the openings of the air tubes, E E, when the lamp is suddenly raised.

Third, A round or oval hollow wick formed around the central tube of the burner, from two flat strips hanging loose in the lamp.

Fourth, The screen or perforated guard, K, made in a flat conical or convex form, across the inner chamber.

35,158.—J. H. Irwin, of Beardstown, Ill., for Improvement in Coal-Oil Lamps:

I claim, first, Having the draught passage of the lamp divided into compartments by partition plates, b, or b', so arranged as to prevent horizontal or lateral currents of air, through the draught passage or burner, below the flame, substantially as and for the purpose set forth.

Second, Having the upper end of the wick tube, C, made of rounded or scolloped form, in combination with a cone or deflector, B, having the apex or top around its slot, f, made of corresponding form, as and for the purpose set forth.

35,175.—E. B. Requa, of Jersey City, N. J., for Improved Lamp:

I claim, first, The combination of the two tubes, G J, one placed within the other, and the inner one inclosing the wick tube, E, when said tubes are provided respectively with cones or deflectors, H I, so constructed as to admit of a space, e, between them, having a narrow passage, e', to increase the rapidity of the draught, and cause a quick current of air to impinge against the sides of the flame, j, substantially as and for the purpose set forth.

Second, Providing the lower end of the wick tube, E, with a cap, F, to serve as a top for the fountain, A, when said cap is used in connection with the tube, G, applied to the burner D, the latter screwed into the jacket or case, B, and all arranged, as shown, to form a simple device to admit of the flame being supplied with a requisite quantity of air at its base, and by a current which passes around the fountain, A, to keep its contents cool, as described.

Third, Insulating the cones, H I, from their respective tubes, G J, by means of plaster of Paris, or other good non-conducting cement, for the purpose of preventing the heat being conducted down to the burner and fountain, as set forth.

Fourth, The combination of the two tubes, G J, cones, H I, wick tube, E, cap, F, burner, D, flanch, g, jacket or case, B, and fountain, A, all arranged as and for the purpose specified.

35,177.—E. Y. Robbins, of Cincinnati, Ohio, for Improvement in Ventilation:

First, I claim the arrangement of the hot-air chamber, or reservoir of heat, for warming the floor and lower part of the rolls, in connection with the arrangement for the introduction at the bottom of the room of moderately-warmed fresh air which has not been in contact with the hot metallic surface, either of hot water pipes or steam pipes, or of a stove or furnace, or any other highly-heated surface, substantially as set forth.

Second, I claim the use of the lower and outer boundary of the hot-air chamber as a large non-metallic warming surface, for the purpose of warming, to a moderate degree, the fresh air, before it enters the room, substantially as set forth.

Third, In case of warming the upper rooms by the waste heat of the fire in the lower story, I claim the arrangement of an inner smoke flue within the brick flue or chimney, E Fig. 3, and the diaphragm, Fig. 5, for turning the current of hot air rising between this inner smoke flue of the sides of the chimney inward under the floor of the upper room, for warming it, or any equivalent device between.

Fourth, In using hot-air pipes for warming cars or rooms, I claim the making of said pipes in their different parts, of different materials, and of different shapes, so that their conducting and radiating power shall increase, as the distance from the furnace or source of heat increases, and as the temperature of the air within them decreases; so that they shall distribute the heat as nearly uniformly as possible, throughout their entire length, substantially as set forth.

35,183.—D. C. Smith and W. P. Walling, of Adrian, Mich., for Improvement in Water Elevators and Conveyers:

We claim the combination with carriage, K, of the plate, M, arranged to work in joint operation with spring, T, pawl, 12, incline planes, X X, clamps, V V, and lug, 18, for the purpose set forth.

Second, We also claim, in combination with the foregoing, the bail, 2, rod, 3, and cover, 4, connected together as described, and for the purpose specified.

35,184.—H. J. Smith and Woodruff Jones, of Philadelphia, Pa., for Improvement in Apparatus for Testing Coal Oils, and other Mixed Liquids:

We claim determining the amount of volatile inflammable matter in compound liquids, by means of a thermometer, and a flame, the thermometer being applied to the liquid, while the heat is imparted to the latter, and the vapor generated by the heat being directed to the flame, substantially as set forth.

35,212.—Claude Brison, of Chalons, sur Saone, France, for Improvement in Furnaces for Retorts, Stills, &c.:

I claim providing ovens, kilns or furnaces in which retorts are or may be made use of for various manufacturing or other purposes, with vertical retorts, each having a suitable lid and a movable bottom or obturator, the latter jointed to a lever for allowing to open or shut at pleasure the lower opening of the retort, substantially as described and for the purposes specified.

35,213.—S. H. Brown, of Troy, N. Y., for Improved Hydrant:

I claim, first, The valve, a, in combination with the sliding valve D, when constructed and arranged so as to operate, substantially as described.

Second, The sliding valve, D, with its adjuncts, K E, and i, whereby it and the valve, a, may be operated without the use of stuffing boxes, substantially as described.

Third, The grooves in the face of the sliding valve, D, whereby the waste water in the discharge pipe is allowed to pass off, for the purpose and substantially as above set forth.

Fourth, The inclined planes, n and o, in combination with the double armed lever, M, as and for the purposes described.

35,222.—L. P. Dodge, of Newburgh, N. Y., for Improvement in Pumps:

I claim, first, The arrangement of the valves, M N, in the valve chambers, K L, in the base of the air vessel, H, and arranging the seats, f g, near the joint between the parts, so that there is but a single joint of small area connecting the passages, F G, with the air chamber, all as set forth and for the purpose specified.

Second, In combination with the foregoing, arranging the joint connecting the air chamber and the cylinder casting in the same plane, so that both may be finished at one operation, as set forth.

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W. & J. GRIFFITHS & CO.—City Tube Works, Malleable Iron and Brass Foundry, No. 27 North Seventh street, Philadelphia. Manufacturers of Wrought Iron Pipe, Lap-Welded Flues and Fittings; also, Brass Work of all descriptions, for Gas, Steam and Water. Particular attention given to Heating Buildings, &c.

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PATENT-OFFICE NOTICES.

UNITED STATES PATENT-OFFICE,
WASHINGTON, April 17, 1862.

ON THE PETITION OF PHEBE Ann Fisk, Executrix, &c., of Almond D. Fisk, late of the City, County, and State of New York, praying for the extension of a Patent granted to the late Almond D. Fisk, Nov. 14, 1848, and re-issued March 6, 1860, for an improvement in Coffins, for seven years from the expiration of said Patent, which takes place on the 14th day of November, 1862.

It is ordered that the said petition be heard at the Patent-Office on Monday, the 27th of October next, at 12 o'clock m.; and all persons are notified to appear and show cause, if any they have, why said petition ought not to be granted.

Persons opposing the extension are required to file in the Patent-Office their objections specially set forth in writing at least twenty days before the day of hearing; all testimony filed by either party to be used at the said hearing must be taken and transmitted in accordance with the rules of the office, which will be furnished on application.

The testimony in the case will be closed on the 13th of October next; depositions and other papers relied upon as testimony, must be filed in the office on or before the morning of that day; the arguments, if any, within ten days thereafter.

Ordered, also, that this notice be published in the "National Republican," Washington, D. C., and "Tribune," New York, N. Y., once a week for three successive weeks; the first of said publications to be at least sixty days previous to the day of hearing.

D. P HOLLOWAY,
Commissioner of Patents.

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ANTI-FREEZING APPARATUS.

FREEZING OF GAS-PIPES.—Walton's Patent Anti-Freezing Apparatus illustrated by Engravings in the AMERICAN GAS-LIGHT JOURNAL, of Jan. 1, 1861, page 212, is the most simple, durable and efficient of any known process.
See also certificates from Cincinnati, O., and Louisville, Ky. Gas-Works in same number, page
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Sup't Gas-Works, Louisville, Ky

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FLUID FOR GAS-METERS.—The undersigned is prepared to furnish the Glycerine Meter Fluid in quantities to suit purchasers. *It does not evaporate, can be made to stand any degree of cold liable to occur in this country or in Canada, and does not corrode the metals of the meter. It has been in use successfully for the last three years.*
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PATENT BITUMINIZED PIPES,

For the Conveyance of Water, Gas, and Drainage.

This important invention, patented by Mr. Charles Newbold, and now for the first time introduced to the public, may confidently be stated to be one of the greatest interest and commercial value, as the Patent Bituminized Pipes possess all the qualities necessary for the conveyance of Water, Gas, Sewage, Mine-Pumps, &c., viz.: great strength, great durability, and inoxidability, with the immense advantage of being about *one fifth* the weight of iron pipes, and about 35 per cent. cheaper; whilst, compared with lead pipes, the Bituminized Pipes are only about *one fourth* their price, without the possibility of the formation of the oxide and carbonate of lead, so dangerous for every purpose. They will stand 150 degrees of Heat, and after many trials it has been satisfactorily proved that rats or vermin will not touch them. They also withstand the action of all acids and salts.

Iron pipes are at present frequently covered with a coating of bitumen or coal tar before they are laid down; but the adherence of this coating to the metal being very imperfect, on account of vibration and the difference of expansion, this preservation is insufficient, besides being exposed to a number of influences which neutralize its efficacy—galvanic currents materially assist the formation of oxides and deposits, which cause the obstruction and eventually the destruction of metallic pipes.

The Patent Bituminized Pipes are neutral, non-conductors of electricity, and consequently are not exposed to any of the deteriorating influences mentioned above. The process of manufacture of these Pipes consist in causing a roll of paper to pass through a reservoir of melted bitumen, after which it is tightly coiled around a mandril to any required thickness; and thus, when hardened, a tube is formed of perfect texture, great hardness, and enormous strength. These Pipes are proved, by hydraulic pressure, to resist a pressure of 220 lbs. to the square inch, equal to 506 feet head of water, which is more than double the altitude of the highest reservoir. The bituminous composition which unites and covers these Pipes is so well known as an excellent preservative, that it will be unnecessary to demonstrate that, when laid underground, the durability of the Patent Bituminized Pipes may be considered as unlimited. The Pipes are made in lengths of seven feet, and are connected by socket joints of the same material as the Pipes; or they can be fitted with iron flanged sockets, screwed together in a most simple and inexpensive manner.

For Gas these Pipes are invaluable; the Gas-lining which we insert effectualy resists the action of Gas, and being non-conductors, there can be no condensation in them, and the joints made with the Patent Cement are so strong as to entirely prevent Leakage.

The cost of laying the Pipe is also small, compared with those of iron, and can be done by mere laborers. The Bituminized Pipes have been in use the last three years, for the conveyance of gas and have been ascertained to be as perfect now as when first laid down.

DIRECTIONS FOR JOINING THE PATENT BITUMINIZED PIPES.

Pack the pipes level in the ordinary way; slip the collar over one of the pipes; draw the ends close together and warm them by putting a hot iron between them; then press them together so as to make them adhere; take a piece of iron wire netting, about half an inch in the mesh, a little narrower than the length of the collar, and long enough to wrap once round the pipe, spread the collar over it and the joining; close the ends with clay; pour the melted cement into the manhole of the collar, and fill up the interior space; then remove the clay and the joint is finished.

It is necessary to leave a small vent hole in the clay at each end of the collar to allow the air to escape as the cement is poured in, that there may be no flaws or air bubles in it when cold. If in cooling the cement settles in the manhole, fill up again.

N. B.—The cement should be broken into small pieces and melted in a pot as you do lead, at a low temperature, until it is dissolved; it must be stirred while melting; then take it off and keep stiring it as it cools until it becomes nearly as liquid as water; then pour quickly.

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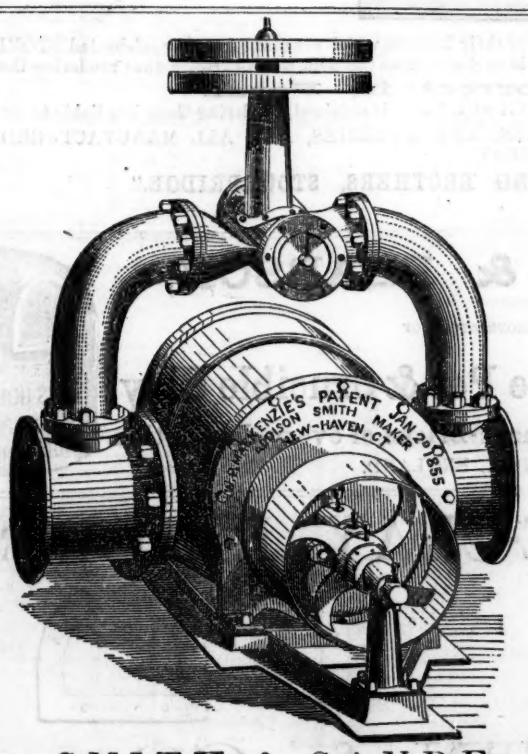
Cement for Joining, For Sale as above.



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They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

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The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan. The Cupolas are manufactured in sizes to melt from 1 ton to 20 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent. fuel. Address

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IRON, TIN, and WOOD.

It consists of seventy-two parts Oxide of Iron, and twenty-eight parts Cement Lime Stone in the one hundred pounds.

It has much more body than red or white lead. It is warranted perfectly water and fire-proof and to withstand a greater heat on metals, without scaling, than any other paint in use.

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It hardens under water, as has been fully demonstrated by its application to gas-holders, by many of the largest gas companies in the United States; which companies having thoroughly tested its properties as herein claimed, pronounce in its favor over any other paints in the market, even though sold at double its price.

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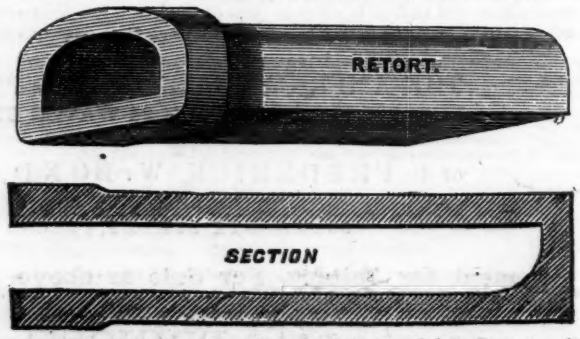

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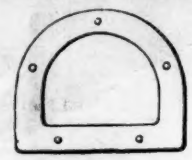
COWEN'S PATENT FIRE-CLAY RETORTS.



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Have always been, and are still, the most extensive manufacturers of FIRE-CLAY RETORTS in the United Kingdom, and were the only parties to whom a Prize Medal was awarded at the Great Exhibition, in London, 1851, for

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Orders for FIRE-CLAY RETORTS, TILES, BEARERS, and other articles in Fire-Clay, receive immediate attention, and are promptly executed at their Works, as above. Drawings of Settings adapted for Cowen's Patent Fire-Clay Retorts supplied.

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N. B.—J. C. & CO.'S RETORTS are well adapted for small Gas-Works, as they can be used without an Exhauster.

POTTS' REVOLVING SIGNAL LIGHTS,

PATENTED SEPTEMBER 8, 1857.

Mr. ALBERT POTTS, the well known Inventor of the LAMP-POST LETTER-BOXES, which have been adopted by the Post-Office Department for the large cities of the United States—and also of the GAS METER BOX, to be set in the front walls of houses, thus doing away with visits from Gas Inspectors, or burglars in gas-clothing, has lately brought forward a third Invention, which in point of importance and world-wide usefulness, surpasses the others entirely.

These SIGNAL LIGHTS are intended for use on Vessels propelled by Steam, and those exclusively. They specially indicate the presence of a Steamer, and by their use, there will be less likelihood of mistakes, and consequent collision than at present. They are also intended for SIGNALLING AT NIGHT, and can be used for that purpose UNDER ANY CODE of SIGNALS NOW ARRANGED FOR FLAGS.

This Improvement in Lights for Steam Vessels, consists in having the Lanterns containing the colored lights, connected by means of a series of cogged gearing with some convenient part of the Engine or Machinery, so as to cause them to have a revolving motion around their axis. On side wheel steamers, the Lanterns should be placed directly over the wheel-houses, and the power, or motion to turn them, may then be very conveniently obtained from the paddle wheel shaft. On Propellers, the Lanterns should be placed on each side of the Pilot House, or hurricane deck, and the rotary motion derived from any convenient or suitable part of the Engine or Propeller Shaft. Each Lantern is supported on the end of movable cranes, so that their relative positions may be changed and properly adjusted to suit the view of observers on either side of the vessel at the time of signalling.

The Lanterns to be used in this improvement may be constructed for Burning Oils, Fluids, Gas, or any of the known modes of illumination, and should be furnished with one or more lenses and reflectors, so as to concentrate the rays of light, and project them over the horizon with the greatest intensity. The lenses for this purpose should be made with colored glass, viz., Red and Green, and the position of the respective Lanterns, according to the color of the lenses therein, must be placed on the sides of the vessel so as to answer to the requirements of Rules and Regulations made and published by the Supervising Inspectors of Steamboats, agreeably to the Act of Congress of the United States in such cases made and provided. That is to say—by said Regulation—the Lantern having the green lenses for producing the Green Colored Light, must be placed on the starboard side of the vessel, and the other Lantern producing the Red Light, to be placed on the port side thereof. In pursuance, also, of the aforesaid Rules and Regulations, there is to be found in board and behind each Lantern, a screen to answer the purposes therein mentioned.

The cogged gearing, by which the Lanterns are connected with the Engine or paddle wheel shaft, and thereby caused to revolve when the Engine is in motion, is so arranged that the connection may be readily shipped or unshipped, and the lanterns made stationary or otherwise, at the pleasure of the Pilot, or those whose duty it may be to operate and attend to the same. The cranes on which the Lanterns are placed, are also rigged so as to be readily turned horizontally from one position to another, so as to present one or both lights to the view of observers when laying athwart ships at the time of signalling.

On the Use and Application of the Improvement for Night Signals.

When the vessel is under weigh, or going ahead in its course, the Lanterns are to be placed directly athwart ships, so that such colored light therein will then have the position and place prescribed by Rule Seventh of the aforesaid Supervising Inspectors of Steam Boats, and with the screens behind them, as above described, will then answer all the intents and purposes for which the colored lights are thus required to be used, as illustrated in the several diagrams published by said Inspectors for the working of a system of Colored Lights. The Lights in this case, according to the color seen by the observer, indicate the course or direction of the vessel whereon they are carried. When the Lanterns with the colored lights therein, are made to revolve around on their axis, as proposed in this improvement, in addition to the signal above, another, and as we believe, very important and useful signal is thus formed, indicating that the vessel, whereon it is carried is a Steamer. In dark foggy nights, it is found by experience, to be somewhat of a difficult task to distinguish sailing vessels from Steamers and Propellers, especially when the latter are rigged, and carry a press of sail. When Steamers meet "head and head," it is the duty of each to pass to the right, or, on the larboard side of the other. Whereas, when a Steamer meets a sailing vessel, the former must give way and allow the latter to pursue its course. Hence, to carry out the regulations of the said Steamboat Inspectors, and prevent collisions, it is important to have some infallible sign, whereby the character of the vessel may be readily seen and determined. Several very fatal collisions have recently taken place through mistakes of this kind.

On Signals for Speed and Distance.

The gearing of the Lanterns with the paddle wheel or propeller shaft, may be so arranged as to be an index of their speed. A very good proportion, would probably be to make the Laterns turn about one third as fast as said shaft. Hence, when the speed of the vessel is previously known, when making a certain number of revolutions of the paddle or propeller, it becomes an easy task from observing the time with which the Lanterns thereon may be turning to approximate to the speed with which the said vessel is moving at the time of observation. Again, as the arcs described by the rays of light from each lantern, as they revolve around on their axis, is greater in proportion to the distance from said lantern, so will the time in which said rays move over any given space, be less in the same proportion. Hence, when the lights are very remote, or far off, from the observer, the duration of each column or cylinder, of rays from each lense, would pass the eye of the observer, in a short space of time, or with great velocity. Whereas, at a nearer point of observation, the time of its passage would be considerably lengthened, or the motion thereof apparently much slower. From these facts, we believe the improvement is susceptible of indicating, in an approximate manner, the speed and distance of vessels whereon the revolving lights may be used.

On the Application of the Improvement for Marine Telegraphic Purposes.

The Revolving Lights can be readily applied to the general purposes of Marine Signalling at night, as follows: In order to show this application, we have adopted the Numbers as given in Roger's Code of Marine Day Signals, believing that work to be somewhat of a standard in matters of this kind. Instead of the flags used in the above code, for day signals, to indicate the combinations of two or more letters of the Alphabet, which combination is referable to certain numbers indicative of the words or sentences telegraphed, we propose to perform the same operation, at night, by means of the two revolving colored lights, so as to indicate the numbers directly to which the intended words or sentences to be telegraphed are referable. Thus, whether the vessel to be signalled is ahead, astern, or abaft the beam, the position of the two colored lights must be so adjusted, by means of the moveable cranes, whereon said lanterns or lights are fixed, that the two lights may be fully made visible to the observer. When both lights are thrown into this position, stopping the motion of the lanterns may be the signal for calling attention, or a rocket fired off, or the steam whistle blown, would answer the same purpose. Now, in order to represent the ten numerals, we propose to indicate them by the respective motions of the two colored lights, as follows:

RED LIGHT.				GREEN LIGHT.			
One Red,	Represents	Number	1.	Two Green,	Represents	Number	2.
Three do.	do.	do.	3.	Four do.	do.	do.	4.
Five do.	do.	do.	5.	Six do.	do	do.	6.
Seven do.	do.	do.	7.	Eight do.	do.	do.	8.
Nine do.	do.	do.	9.	One do.	do.	do.	0.

In the above arrangement, it will be seen that all the odd numbers are made by the Red Light, and the even numbers by the Green Light. In order to indicate the repeat of the last number, once or more times, or for other special purposes, which may hereafter be found useful and necessary, an even number of lights may be shown by the Red, and an odd number by the Green. It will be understood that when the Lanterns are made with three lenses in them, the numerals as above arranged are formed by the number of times a new light or lense is presented to the observer. Thus to indicate the number 3, the Red Light or Lantern would make one entire revolution; and to make the number 6, the Lantern carrying the Green Light would make two revolutions, and so on with the other numbers. When a symbol is made, the motion of the Lantern is to be suspended for a short time, and when a number expressing a sentence is formed, the lantern may be stopped for a longer period, or some one of the special signals above referred to, may be used for this purpose.

To show the application of this improvement as above mentioned, whereby these Lights can be used as readily for Night Signals, as Flags are used for Day Signals by the author of Roger's Code, we shall use the sign O colored red or green, according to the light used, to show the number of movements performed by the respective lights in order to represent any desired number of said code, suitable for the required purpose.

RED LIGHT.	GREEN LIGHT.
O, O, O, O, O,	
O, O, O, O, O, O, O.	
	O, O.
	O, O.

The above would represent the number 5722, and by reference to said Roger's Code, would be found to stand before the sentence:
"WILL YOU SHOW THE NUMBER THAT REPRESENTS YOUR NAME?"

RED LIGHT.	GREEN LIGHT.
O.	
O, O, O, O, O.	
O, O, O, O, O, O, O.	
	O, O.

Here the number expressed is 1572, and per the same Code, stands for
"WHERE ARE YOU BOUND?"

RED LIGHT.	GREEN LIGHT.
O.	
O, O, O, O, O, O, O, O, O.	
	O, O.
	O, O, O, O, O, O, O, O, O.

The number thus expressed is 1928, and per said Code is
"WHAT IS YOUR CARGO?"

RED LIGHT.	GREEN LIGHT.
O, O, O, O, O.	
	O, O, O, O, O, O.
	O.
O, O, O.	

Here the number expressed is 5603, and stands for
"HAVE YOU ANY NEWS?"

(RED LIGHT.)

Fig. 2

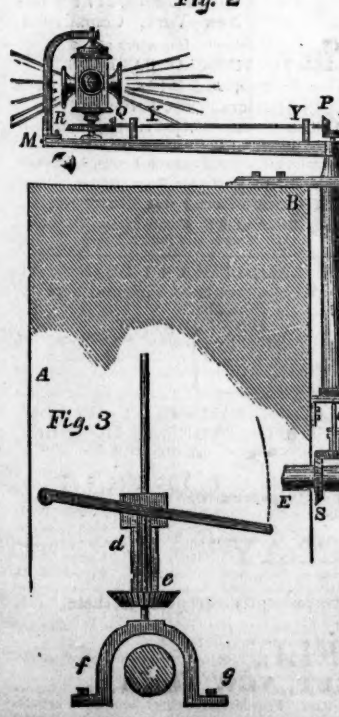

Fig. 3

(GREEN LIGHT)

Fig. 1

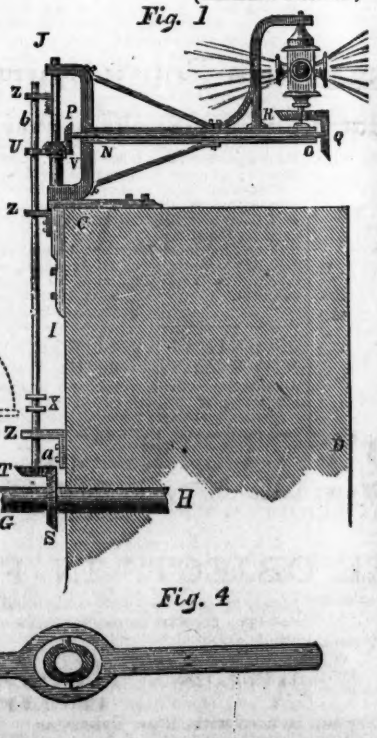

Fig. 4

MECHANICAL CONSTRUCTION.

In our engravings, Figs. 1 and 2, represent Vertical Sections through the wheel-house. In them E F and G H represent portions of the main Shaft. In Fig. 1, I J is a stout Iron or Wooden post, fastened against the side of the wheel-house, directly over the main shaft. On the upper part of this post, is fitted the moveable arm or crane N O, to the main shaft is fitted the bevel wheel S, and to the lower end of the rod a b, is fitted a corresponding wheel T. U is a small pinion on a b, which gears with the spur wheel, V, which in turns gives motion to the wheels, P and Q, and so revolves the lamp R. It will be seen that a Rotary motion is given to the lamp, when the main shaft is in motion and a b connected.

It can be disconnected by a lever, acting between the bosses X, which will elevate the rod in the guides Z Z Z.

Fig. 2 is another arrangement, for the same purpose. In this, K L, represent a hollow Shaft, on which is firmly fastened, the arm L M, on which is the lantern. The hollow post is secured to the wheel-house by the straps K and B, and it can turn freely in them, the other part being the same in them as in fig. 1

The lever K W, when drawn down, will turn the frame in any required position around the Shaft c U. In fig. 1, the arm or crane N O, may be operated by cords from the wheel-house, but in this device, the rod c U. does not lift up as in fig. 1, but in its place, the lower end is made square, and on it slides the short tube, d E, shown in fig. 3. The lower end of the rod turns on a bridge, f g, spanning the main shaft. On the upper end of the tube, d e, a lever is attached by means of boxes and collars as shown in fig. 4. This lever when raised carries with it the beveled wheel T, thus disconnecting the gearing apparatus.

ALBERT POTTS, Patentee,
PHILADELPHIA, Pa.

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